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Whirlpools of Information: Information Processing in Policy Subsystems 1995-2010

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Dedication

I dedicate this dissertation to my family, without you this journey would have been impossible. My grandmother, Josephine Harper, encouraged my love for academics. My parents, Donald and Karen Surface, taught me the meaning of hard work and their sacrifices have enabled me to pursue my dreams. My brothers, Brad, Nick, and James, taught me to be strong in the face of adversity and have encouraged me every step of the way. And, most importantly, I would like to dedicate this to my husband, Matthew, and our daughter, Harper. It is impossible to become discouraged when such love and happiness is waiting at home. Thank you all for your love, patience, and encouragement.

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Whirlpools of Information: Information Processing in Policy Subsystems 1995-2010

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This project focuses on information processing in policy subsystems, specifically how congressional committees in the domestic commerce, energy, and health care policy areas prioritize available information, with an extended analysis of information supply and prioritization in energy policy. I examine the conditions under which federal bureaucrats are most likely to supply information to Congress in these three policy areas. I seek to determine whether and to what extent the bureaucratic supply of information changes by issue area, presiding congressional committee, and in response to problem uncertainty. My findings suggest that the number of bureaucrats testifying varies by both policy area and committee type. Furthermore, as the problem uncertainty for a committee increases, so too does the number of federal bureaucrats invited to testify. These findings are especially true for careerist bureaucrats. Within energy policy, my findings show that the subsystem actors most likely to supply information at a hearing varies across committees, over time, and by specific issue area. By examining who supplies information, this project will provide a better understanding of how subsystem actors are prioritized by congressional committees as information suppliers. This study is important because the information supplied by these non-elected policy elites can then influence the problem definition process, structure policy debates, and impact policy formulation.

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Chapter 1: Introduction

In 2007, there was a general agreement among members of Congress and the president that energy independence was, indeed, a crucial problem facing the United States (Pierce 2007; Hall 2007; Neal 2007). However, there was much disagreement over the most salient dimensions of the energy problem. There was a divide in Congress over how to approach energy independence, whether the lack of conservation, low production, or low variability of available fuels was at the root of the problem (Landrieu 2007; Shimkus 2007).

Congress needed information to decide how to more clearly define the problem—energy independence defined as an independence from foreign oil or energy independence defined as an independence from fossil fuels more generally. Largely, Democrats pushed more for the latter while President Bush and Republicans in Congress pushed more for the former (Pierce 2007; Hall 2007; Neal 2007).

Subsystem actors were very eager to supply information to Congress in an effort to sway the definition in one direction or the other. Many states and municipalities were pushing more for energy independence to be defined as an independence from fossil fuels generally (McConnell and Sanchez 2007; Sanchez 2007 (1); Sanchez 2007 (4); Sanchez 2007 (3)). Many coastal states, Florida in particular, were worried that a move to produce more oil in the U.S. would lead to an increase in drilling in the Outer Continental Shelf, potentially interfering with their important tourism industries (Nelson 2006; Davis 2006). In addition, municipalities were in favor of energy independence as a move away from fossil fuels in effort to take advantage of potential federal subsidies for producing electricity from alternative and renewable fuels (McConnell and Sanchez 2007; Sanchez 2007 (4); Sanchez 2007 (1)).

In contrast, Republicans and American oil companies and petroleum manufacturers were pushing to define energy independence as independence from foreign oil ("Energy Overhaul…" 2007; "Twenty in Ten…" 2007). These groups were in favor of keeping then-current government subsidies for exploration as well as increasing the areas available for potential exploration, most notably the Outer Continental Shelf in the Gulf of Mexico and the Arctic National Wildlife Refuge (Talev 2006; "Energy Overhaul…" 2007; "Twenty in Ten…" 2007).

In many ways, the oil industry prevailed given that energy as independence from foreign oil seemed to carry the day. Despite the efforts of some, oil companies maintained the status quo of approximately 20 billion dollars in government subsidies (Sanchez 2008). While Energy Independence and Security Act of 2007 (EISA) did not open new areas for oil exploration, there were no additional restrictions placed. Municipalities, in contrast, were unsuccessful in convincing Congress that the problem of energy independence should be defined as independence from fossil fuels. Congress dropped the addition of a subsidy program for the promotion of electricity produced by alternative and renewable fuels from the legislation (Sanchez 2007 (2)).

The pluralistic theory of information suggests that businesses, interest groups, bureaucrats, and other actors will compete to supply information to Congress in an effort to define or redefine problems and, ultimately, influence the policy making process (Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993; Jones and Baumgartner 2005). This competition to supply information creates an oversupply of information available, requiring Congress to prioritize the information rather than searching for it (Workman, Jones, and Jochim 2009). The above example from the EISA 2007 shows there are clear winners and losers at multiple points in information processing. Not everyone who wanted to provide Congress with information regarding EISA was able.

Some sources of information, such as states and oil companies, were able to successfully communicate their problem definitions to Congress and attempt to steer the debate. As evident from the final bill, not all of the information that was shared with Congress was applied to the legislation—municipalities, for example, were unable to effectively steer the policy debate. This project seeks to understand what determines who is able to gain access to provide information to Congress. Only those sources of information receiving attention from Congress (ex. invited to testify at committee hearings) have the opportunity to shape problem definitions and, thus, the policy process.

This dissertation is composed of five substantive chapters. The first, Chapter Two, reviews the policy dynamics of information processing, reviewing two popular theories of information processing: classic economic theory and pluralistic theory. The pluralistic theory of information suggests an oversupply of information resulting from competition among actors attempting to define the problem for policymakers (Simon 1983; Workman, Jones, and Jochim 2009; Baumgartner and Jones 1993; Jones and Baumgartner 2005). By defining the problem, an actor can steer policy debates, structure solutions in their favor, and have a major impact on the policy process (Kingdon 1984; Edleman 1964; Stone 1989). Based on this theory, Chapter Two suggests there are three parts to information processing: supply, prioritization, and application. The supply of information is just that, actors competing to supply information to Congress. The prioritization requires congressional committees to decide which sources of information to attend (and invite to testify) and which to ignore. The application is the process in which Congress decides which of the prioritized information is applied to the policy making process.

Building on the previous chapter, Chapter Three introduces a new approach to information prioritization or how Congress deals with the oversupply of available

information. The new approach to information prioritization introduced here suggests that how congressional committees decide which sources of information to attend and which to ignore is determined by three factors: policy characteristics, committee goals, and problem uncertainty.

Policy areas differ in three important ways. First, the number of dimensions that characterize an issue area differ from one issue to the next (see Jochim and Jones 2013). Some policy areas are more accurately characterized by a single ideological dimension, such as health care policy. Other policy areas like energy, though, are more accurately characterized by multiple dimensions, including ideology and constituency and regional preferences (Jochim and Jones 2013). Second, the arenas in which policy making takes place varies from issue to issue. Change in health care policy is likely to occur via legislative enactment; whereas, changes in energy policy are most likely to be administratively driven (Grossman 2013). Third, the groups that are active in the policy making process vary from one issue area to another. Policies with publics have an active, diverse set of actors involved in policy making; whereas, policies without publics have a much more limited set of actors, many of which are technical or scientific experts (May 1991). These differences in policy areas are reflected in the information prioritization process because the preferred sources of information, the necessary sources of information, and the available sources of information can vary from one issue to another depending on whether the policy area is best characterized by a single ideological dimension, the arena in which policy change occurs, and whether the policy area has an active public.

The second factor that influences the information prioritization process of congressional committees is the shared goal of the committee. As Fenno (1973) first pointed out, members of Congress self-select onto congressional committees based on

their top priorities: constituency service, making good public policy, or power and prestige within the chamber. The result is that each committee shares one of these goals. The shared goal of a committee then leads to committees preferring those sources of information which can best facilitate goal achievement. Constituency committees prefer those sources of information (constituents, businesses, and interest groups) that allow members to be best informed on the needs and preferences of their constituents. Members of policy committees prefer information from partisan coalition (interest groups and fellow members of Congress) to provide information that will reinforce policy preferences. Power committees tend to prefer information from elite information sources (presidentially appointed bureaucrats and fellow members of Congress) that reinforce their power within the chamber. It is important to note that this project is focused on institutional information processing, which requires looking at the committees as a whole. Individual members of the committees may prefer different specific sources of information that reflect their personal ideological or constituencies' preferences, but the committee as a whole will have a shared preference for types of information sources: interest groups, states and localities, businesses, members of Congress, or bureaucrats.

The third factor that influences committee information prioritization is problem uncertainty. Problem uncertainty is defined as when a congressional committee is unsure about the nature of the problem or which attribute of a problem is the most important. The best way to alleviate problem uncertainty is with accurate, reliable, and stable information. Bureaucrats are the most capable of supplying information that meets this criteria given that they are created by law to gather policy information, have long-term, repeated interactions with congressional committees, and have relatively long

shelf-lives. As the problem uncertainty of a committee increases, so too will the number of bureaucrats invited to testify at hearings.

The dataset used to understand how policy area, committee goals, and problem uncertainty affect information prioritization is the most extensive of its kind. All 4,745 congressional committee hearings on domestic commerce, energy, and health care policy areas from 1995-2010 were collected. Each hearing was then coded for policy area, committee type, problem uncertainty, and several control variables. Then, all 33,090 witnesses testifying at those hearings were collected and coded according to which institution type each represented. The result is an expansive dataset coded to incredible detail. For instance, federal bureaucrats are coded not just as bureaucrats, but also according to their appointments (ex. careerist or presidentially appointed) as well as agency type (ex. defense, energy, land and agriculture). Businesses are coded according to size and their specific industry. Businesses with one thousand or more employees are coded as large businesses; whereas, those with less than one thousand employees were coded as small businesses. Businesses were additionally coded for the industry in which they are active. The dataset is used to track congressional committee attention to major witness types and to these more specific witness types. The analyses presented in the later chapters of this dissertation is only the beginning of the possibilities for this dataset.

The new approach to information prioritization is addressed by four main questions analyzed in Chapters Four through Six. The first, most broad question is how does the information preferences of congressional committees vary by policy area, committee goals, and the presence of problem uncertainty? The findings in these three chapters suggests that all three factors: policy characteristics, committee goals, and problem uncertainty influences which sources of information are prioritized at a given

committee hearing. The second question, which addresses whether federal bureaucrats have an advantage in the information supply process given their unique characteristics and relationships with Congress, is most directly analyzed in Chapter Four, but there is some additional supporting evidence in the other chapters. The findings suggest that as congressional committees become more uncertain about a problem, they invite more bureaucrats to testify at hearings. Policy characteristics and committee type also appear to influence how congressional committee prioritize bureaucrats as sources of information. The final two chapters both address the remaining questions: How do congressional committees make tradeoffs between sources of information when engaged in information prioritization? And, when do non-bureaucrats appear to have an advantage in information processing? Chapter Five primarily focuses on when private witnesses (interest groups and businesses) are most likely to testify at energy policy hearings. Chapter Six, though, looks at when public witnesses are most likely to be prioritized as sources of information at energy hearings. The findings from these two chapters suggest that policy characteristics of issue areas within energy have a major influence on who is invited to testify. Those issue areas with publics are likely to have more businesses, interest groups, and states and localities testifying. Those issue areas without publics, though, are much more likely to have increased numbers of federal bureaucrats testifying. In addition these two chapters reinforce the finding that problem uncertainty leads congressional committees to invite more federal bureaucrats to testify.

In short, the goal of this dissertation is to explore the pluralistic theory of information processing and apply it to information processing in policy subsystems and, by doing so, present a new approach to studying information prioritization by congressional committees. The key question here is, how does information

prioritization at congressional committee hearings vary by policy area, committee type, and the presence of problem uncertainty?

Chapter 2: Policy Dynamics of Information Processing

There are two popular approaches in political science to studying information processing: the classic economic theory of information and the pluralistic theory of information processing. The first is most popular in institutional studies and emphasizes the limited and costly nature of information (See Stigler 1961 and Mitnick 1975). According to the classic economic theory, information is scare and Congress must use incentives to solicit information from potential information suppliers. The second approach, the pluralistic theory of information, is popular in policy process studies and suggests a very different scenario in which information is overabundant with actors competing to supply information in an effort to affect policy. Congress is not tasked with searching for or soliciting information, but rather filtering and prioritizing it.

These two theories run parallel to one another. The pluralistic framework suggests the policy the policy space is multidimensional and messy with actors competing to help define the problem, structure debates, and influence the policy-making process. Classic economic theory suggests a well-defined policy space with actors withholding information to ensure power and control in an issue area. The differences between the two theories and the subsequent implications for information processing will be discussed in great detail in this chapter.

The following sections of this chapter review the information processing literature and advocate for the pluralistic explanation of information supply. The pluralistic approach to information processing suggests an oversupply of information exists in policy making as a result of political elites competing to define policy problems. By subscribing to this pluralistic theory of information supply, the focus on information processing is on the prioritization of information rather than on the search

for information. The question of interest then is, how do policymakers choose which information providers receive attention and which are ignored?

The rest of the chapter is comprised of three sections. The first section defines information in the policy-making process and summarizes the existing literature on information processing, arguing for the accuracy of the pluralistic perspective in describing the problem definition process. The next section argues for the appropriateness of policy subsystems for studying information processing and the final section discusses the three components of information processing: supply, prioritization, and applicationand the motivations of actors therein.

INFORMATION PROCESSING: A REVIEW

Understanding how information impacts the policy-making process is important for three reasons. First, information is a necessary ingredient in the public policy process. Policymakers, such as members of Congress, need information regarding the salience and definition of problems (Kingdon 1981; Baumgartner and Leech 1998; Hilgartner and Bosk 1988; Burstein and Hirsh 2007; Baumgartner and Jones 1993; Jones and Baumgartner 2005), possible effects of solutions (Baumgartner and Jones 1993; Burstein and Hirsh 2007), as well as re-election consequences for officeholders (Hansen 1991; Burstein and Hirsh 2007).

Second, according the pluralistic perspective of information, bureaucrats and interest groups share information in an effort to define policy problems and steer policy debates. How a problem is defined structures the debate surrounding said policy, including which dimensions of the problem are deemed most relevant. Solutions, then, are formulated in response to the problem definition.

Prior to the Three Mile Island accident in March of 1979, in which a nuclear reactor suffered from a partial meltdown, nuclear energy was defined as technological advancement and sound economics (Baumgartner and Jones 1991). The Three Mile Island combined with an influx of scientific evidence of the environmental degradation associated with nuclear waste prompted a shift in the problem definition of nuclear energy. Nuclear energy post-Three Mile Island has been largely defined in terms of dangers to both humans and the environment posed by potential accidents and nuclear waste. With the change in definitions came a change in the available solutions.

In the decade prior to Three Mile, on average five new nuclear reactors became operational each year, effectively tripling the number of reactors in the United States (EIA 2015). In the five years following the meltdown, there was only an average of two new reactors each year (EIA 2015). No longer was expansion of nuclear energy in the United States highly prioritized as a solution. In fact, 2012 was the first time since before the Three Mile accident that the Nuclear Regulatory Commission approved the construction of a new reactor plant (Abernethy 2012). Solutions since the early 1980s have shifted to focus on waste clean-up and storage, brownfield reclamation, and disaster prevention, all of which reflect the new problem definition (Baumgartner and Jones 1991). In fact, many of the biggest debates in energy in the mid to late 1990s revolved around these points. [1]

Third, according to the pluralistic perspective of information, an oversupply of information will exist in the problem definition process requiring policy makers to prioritize that information, attending to some sources of information while ignoring others. Prioritization of information is necessary given the attention limits of

[1] A major point of contention in energy policy in the mid to late 1990s concerned radioactive waste storages, specifically at Yucca Mountain, Nevada (see "Plan…" 1995; "Nevada…" 1998).

policymakers (see Jones and Baumgartner 2005 and Jones 2001). Attention limits mean policymakers can only attend to a finite number of policy problems at any particular time. Further, policymakers can only attend to a finite number of information sources in regards to a given policy.

This prioritization allows some political elites, such as bureaucrats and interest groups, to direct debate while others are relegated to the sidelines. Prioritization of information results in some sources of information being granted attention from policymakers while denying it to other sources. Those political elites that garner attention are more likely to define problems and direct debates (Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993; Jones and Baumgartner 2005; Kingdon 1984). In the nuclear energy example, it was not necessarily that new information from environmental scientists was suddenly available that influenced a new problem definition. Rather, environmental scientists suddenly became more likely to be prioritized as sources of nuclear energy information by policymakers (Baumgartner and Jones 1991). Policymakers were paying attention to environmental scientists' concerns, which allowed them to influence the direction of the debate.

There are two broad theories of information supply—the classic economic theory of limited information (Stigler 1961) and the pluralistic theory of information common to the public policy literature (see Jones and Baumgartner 2005; Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993). The classic economic theory is most common in institutional studies, specifically in the principal-agent literature (see Mitnick 1975). The pluralistic theory, though, is most prevalent in the describing problem definition and agenda-setting processes.

The clear separation between the application of the classic economic theory and that of the pluralistic theory is due to differences in context, availability and generation

of information, respective definitions of information, as well as the types of search employed by policy makers in the two scenarios. The following sections will review the key differences between the two theories, which are summarized in Table 1.

Table 1: The Characteristics of the Pluralistic Theory of Information and Classic Economic Theory of Information

Characteristics	Pluralistic Theory of Information	Classic Economic Theory of Information
Literature	Public policy	Institutions (principal-agent models)
Context	Problem-space	Solution-space
Problem dimensions	Multiple, complex, un-defined dimensions	Few, well-defined dimensions
Type of information	Technical expertise	Preferences; relationships between solutions and outcomes
Amount of available information	Oversupply	Limited and costly
Goal of information suppliers	Steer policy debates, set agendas	Control
Generation of information	Competition among actors	Incentive-based
Type of search	Broad, entropic search	Narrow, expert search

At first glance, the two theories of information seem contradictory. The economic theory claims that information is limited and difficult to obtain. The pluralistic theory of information, though, suggests an overabundance of available information. The theories do not, in fact, contradict one another because they describe two separate contexts. The economic theory describes information in the solution space, whereas, the pluralistic theory describes information in the problem space.

Information in the Problem Space

In policy debates, problems and solutions are often thrown together, sometimes even used interchangeably. Analytically, though, it is helpful to separate problems and the problem definition process from solutions and the process of identifying viable solutions. Newell and Simon (1972) contend that decisions can be broken down into two parts—the construction and definition of a problem and the identification of alternative solutions. The problem space is characterized by multidimensional problems that are messy and undefined. Decision makers must determine what the problem is or which dimensions of the problem are most important.

This winnowing of problems is often referred to as problem definition or the process through which a phenomenon is labeled as not only a problem, but one that deserves the government's attention (Kingdon 1984; Edleman 1964; Stone 1989). Problem definition can also be conceived as the process through which policymakers identify which dimension of a problem is in greatest need of government intervention (see Dery 1984 and Jones 1994). In the first conception of problem definition, policymakers may identify homeland security as a problem the government should address. The second conception of problem definition is best illustrated in the EISA 2007 example. It was generally agreed upon that energy was a problem, but policymakers had to determine which of the many dimensions of energy policy should receive government attention, such as low U.S. oil production or too high a dependence on fossil fuels.

How a problem is defined not only steers the debate surrounding that particular problem, but also determines which solutions could be considered in the future. Looking back at EISA 2007, had the problem in energy been defined in terms of an independence from fossil fuels, subsidies for alternative and renewable fuels would

likely have taken greater precedent as a possible solution. However, the problem in energy was defined in terms of low oil production in the United States and a need for independence from foreign oil. With this definition of the energy problem, subsidies for alternative and renewable fuels because less appropriate than policies to increase U.S. oil production. The ability to direct debate in this way is the driving force behind actors, such as interest groups, bureaucracies, and state and local governments, supplying information.

How a problem is defined structures which solutions can or cannot be considered later in the policy process (Stone 1989; Kingdon 1984; Baumgartner and Jones 1993). According to the pluralistic theory of information, the ability of an actor to structure the debates and solutions surrounding a problem in his or her favor promotes competition to supply information to policymakers. Political and economic elites such as federal bureaucrats, interest groups, businesses, and state and local governments, compete to supply information to help policymakers define problems (Simon 1983; Workman, Jones, and Jochim 2009; Baumgartner and Jones 1993; Jones and Baumgarnter 2005). An actor will decline to withhold information for fear that a competitor will gain an advantage by supplying informaiton in his or her stead.

This competition to supply information results in an oversupply of information available to policymakers (Simon 1983; Workman, Jones, and Jochim 2009). The oversupply of information is noisy and chaotic (Baumgartner and Jones 2015), with an infinite number of information suppliers each providing different evidence to further his or her own policy goals. To complicate matters more, the available information is often times contradictory. In the case of EISA 2007, some information suppliers were arguing that the energy independence problem should be defined as an independence from fossil fuels. Other, though, provided information that suggested the energy problem was

actually one of low U.S. oil production. These two streams of information would seemingly push policy in opposite directions.

Information in the pluralistic framework of information processing is most frequently discussed in terms of the dimensions of an agenda or policy area (see Baumgartner and Jones 1993; Jones and Baumgartner 2005; Kingdon 1984; Sabatier and Jenkins-Smith 1993). Often particular focus is placed on scientific and technical expertise regarding both the problem and the politics of the problem. Information as technical expertise can be divided into two categories: policy and political (see Leyden 1995). Policy information refers to the problem itself and is directly relatable to the specific issue(s) at hand (Leyden 1995). Current (or estimates of future) unemployment and inflation rates are examples of policy information necessary for defining macroeconomic policy problems. Political information, in contrast, pertains to the political and, more importantly perhaps, electoral consequences of action or inaction in regards to a given problem. Public opinion is an example of political information (Leyden 1995). Policy makers require both policy and political information when making public policy because they need to understand the practical and political impacts of (in)action. In this dissertation, information broadly refers to information as technical expertise.

Information in the Solution Space

The solution space provides an entirely different context for the generation of information because the challenge of narrowing down the relevant dimensions of the problem has already been solved. Well-defined problems with few dimensions characterize the solution space. Policymakers know what the problem is, have identified the most relevant attributes of the problem, and have a narrow (and generally accepted)

list of solutions and agents tasked with implementation. Nuclear energy policy prior to 1979 provides a great example of solution-space politics. The policy area was well-defined in term so technological advancement and sound economics. The generally agreed upon solution was an expansion of the nuclear energy capacity of the U.S., with the number of reactors tripling over the previous decade. Likewise, the Nuclear Regulatory Commission was accepted as the most capable agent of nuclear energy regulation.[2]

Whereas the goal of an actor in the problem space is to supply information in hopes of defining a problem and structuring the relevant debates in his or her favor; actors in the solution space are focused on maintaining control and ensuring favorable outcomes. The principal-agent literature illustrates these struggles over control and outcomes in the solution space (see Mitnick 1975). In studies focusing on the control of the bureaucracy, information usually refers to the preferences and biases of agents relating to alternatives. In the second context, information pertains to the relationship between the solution and its outcomes.

Because information is used to control agents and ensure outcomes, supply patterns are different in the solution space. When seeking power over a policy area and avoiding principal control, agents are reluctant to share information. In 2002, the Environmental Protection Agency (EPA) under President Bush issued rule proposals to relax some important pollution controls in the Clean Air Act. The EPA was, in effect, claiming the power to change clean air policy. When challenged by members of Congress, the EPA refused to offer information to support the changes to policy

[2] The Nuclear Regulatory Commission was created by the Energy Reorganization Act of 1974 to replace the Atomic Energy Commission (www.nrc.gov). The Commission was tasked with nuclear energy regulation, including reactor safety, plant siting, and materials; whereas, the Department of Energy was assigned the role of regulating nuclear weapons.

("Jeffords…" 2002; Hulse 2002). In an effort to regain control of the agency and the policy area Congress, specifically the Senate Environment and Public Works Committee, demanded more information regarding the policy changes. Senators Jeffords (I-VT) and Lieberman (D-CT) went so far as to threaten to subpoena the EPA to obtain the information ("Jeffords…" 2002). The subpoena represents an effort by the principal to incentivize the agent to supply information. The threat of the subpoena provoked a series of promises from the EPA to provide said information, but little more.[3] Clearly information in the solution space is both more limited and costly than that in the problem space.

In principal-agent models, the reluctance to share information results in two problems: adverse selection and moral hazard (see Brehm and Gates 1999). Adverse selection describes a situation in which athe principal is unsure whih agent is the appropriate agent for a particular job. Moral hazard describes the inability of a principal to fully monitor and know the actions as well as true preferences of the agent. The solution space assumes that the first problem, adverse selection, is no longer an issue because the implementing agent has already been chosen. Moral hazard, though, remains a problem the principal must contend with. Information about the agents' preferences and the releationships between solutions and outcomes offer principal a way to combat moral hazard as evidenced by the EPA example above.

Rather than agents sharing information voluntarily and in a competitive manner, the classic economic theory of information suggests that agents will withhold information. The reluctance of agents to share information means that information sharing in the solution space is instead incentive-based (see McCubbins, Noll and

[3] The EPA never followed through with providing the information to Congress, but Congress ultimately got what it was after a year later (October 22, 2003) when the Government Accounting Office issued a report on the entire process (http://www.nrdc.org/media/pressreleases/041001.asp).

Weingast 1987 and 1989). Incentive-based information is characterized by principals inducing agents to share private information about their preferences, biases, and policy outcomes. For example, Congress can use administrative procedures as a mechanism for incentivizing agency behavior (McCubbins, Noll, and Weingast 1987). Through the use of administrative procedures Congress can require the collection and dissemination of policy relevant information. By stacking the deck in their favor, Congress is able to shape the incentive structure for agencies in the solution space (McCubbins, Noll, and Weingast 1987 and 1989). Further, McCubbins and Schwartz (1984) argue that Congress can ensure that interest groups and citizens have the power to provide additional oversight and incentives for ensuring agency compliance. Not only is information in the solution space limited, but the creation of these incentive structures means that it is also costly.

Searching for Information

Classic economic theory accurately describes information processing in the solution space given the limited information present and the costs associated with incentivizing actors to reveal private information. It is also clear that the pluralistic theory of information, which claims an oversupply of information due to competition, is most accurate in describing the problem space. According to these two theories, how policymakers search for information is going to vary wildly between these two scenarios. Recent work by Baumgartner and Jones (2015) suggests that when the dimensions of a problem are low and the problem is well-defined, as expected in solution-space politics, policymakers engage in a narrow, expert search. Policymakers engaged in expert search can target and solicit information from actors they know to hold valuable information (Baumgartner and Jones 2015).

This narrow, expert search is possible for two important reasons. First, much of the uncertainty surrounding the problem has been previously addressed in the problem space (Baumgartner and Jones 2015). Policymakers know the problem and the most important aspect(s) of that problem, thereby winnowing proposed solutions and limiting the information necessary for decision making. Second, the limited set of solutions being winnowed effectively narrows the list of actors involved (or potentially involved) in policy implementation (Baumgartner and Jones 2015). Therefore, not only is the what (information) narrowed but so too is the who (potential information suppliers). For example, policymakers operating in the nuclear energy solutions space have a relatively short list of federal agencies from which they can solicit pertinent information.

The same narrow approach to gathering information would not be appropriate in the problem space. Problems tend to be messy and highly multidimensional. They are often both new and not clearly defined. The information supplied is just as likely to be messy, which we should expect of information supplied in a competitive and crowded atmosphere. Therefore, a broad search is necessary to get a greater understanding of the available information and to account for possible biases and inaccuracies.

The pluralistic theory of information suggests that policy makers need not search or solicit information so much as prioritize or filter the barrage of available information. Baumgartner and Jones (2015) call this entropic search. Entropic search becomes necessary when problems are not well-defined. Policymakers must look to a wider pool of information sources to identify potentially pertinent attributes of the problem (Baumgartner and Jones 2015). Entropic search, being so broad, potentially allows for an infinite number of willing information suppliers. Policymakers engaged in entropic search are, therefore, prioritizing information sources rather than actively searching for information or incentivizing sources to supply it. By prioritizing information,

policymakers must choose to attend to some sources of information while ignoring others.

It is important to note that the problem space and solution space distinctions allow us to highlight differences in information processing in the policy process. However, a policy area is not necessarily contained in only one space. Further, once an issue is defined and occupies the solution space, there is no guarantee that it will remain in that context. Constant feedback in the political system (Jones and Baumgartner 2005) means that a policy is never permanently in one space or another. Policy solutions are frequently reevaluated and redefined. See Baumgartner and Jones (1991) work on nuclear energy. Prior to 1979, nuclear energy was a well-defined policy area with a generally agreed upon set of potential solutions. Like most issues, it was not permanently entrenched in the solution space. As a result of the shock of the Three Mile Island accident and new information regarding the dangers of nuclear waste, the problem was no longer well-defined. Nuclear energy policy was suddenly multidimensional and in need of redefinition in the problem space.

At its core, this project is interested in information processing in the problem space. As argued above, the pluralistic theory of information, which suggests the presence of an oversupply of information, is most appropriate for studying problems. The oversupply of information requires policymakers to prioritize some sources of information over others. Frequently studies utilizing the pluralistic framework of information processing do so in the sub-government context (see Baumgartner and Jones 1993; Baumgartner and Jones 1991; Sabatier and Jenkins-Smith 1993). This project will continue that trend.

POLICY MAKING IN SUBSYSTEMS

Policy subsystems are a great venue for studying information processing in the problem space. Fundamentally, subsystems are information processors, which are best understood with regards to the supply of information and the prioritization of information (Workman, Jones, and Jochim 2009). Policy subsystems consist of issue-specific experts from three sources: congressional committees with jurisdiction, relevant bureaucracies, and vested interest groups (Freeman 1965; Baumgartner and Jones 1991; Thurber 1991; Thurber 1996; McCool 1998). A textbook example of a subsystem would look like Figure 1, with the House Committee on Natural Resources, Department of Energy, and the American Gas Association. Information, depicted by the dark arrows, is shared amongst the actors.

As Thurber (1996) points out, a subsystem can also be conceived as an open communication network in which interest groups, bureaucracies, and congressional committees share valuable information. The open communication conception of subsystems argues that the power of an actor is dependent on the quality and variety of the information it possesses (Thurber 1996). Information of both high quality and variety will allow a subsystem actor more power to influence the policy-making process. Bureaucrats and interest groups are incentivized to provide information in an effort to influence policy making in the committees. Moreover, they are incentivized to share valuable information because the more useful the information is, the more likely Congress will attend to it (see Esterling 2004).

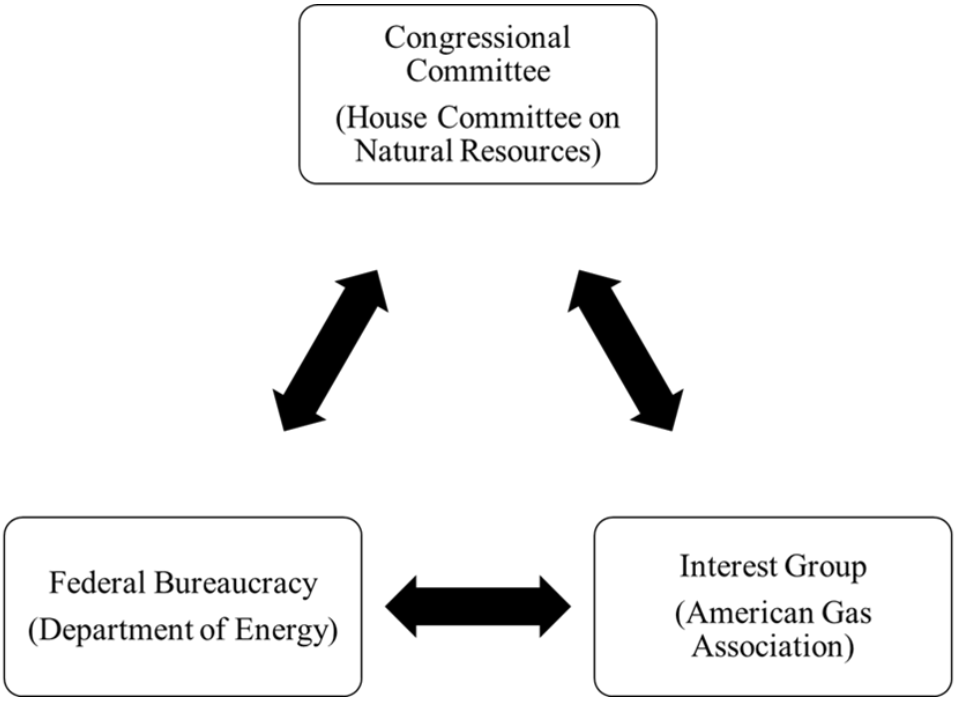

Figure 1: Energy Subsystem Example

In reality, subsystems are much more complex than the example in Figure 1, with multiple congressional committees, bureaucracies, businesses, and interest groups with actors moving in and out of the system over time. The subsystem approach, however, has persisted in popularity in our field given its ability to facilitate the study of bureaucratic politics, public policy, and policy implementation (McCool 1998).

In fact, most policy making occurs within the subsystem setting—off of the agenda and out of the public's view (Thurber 1991; Jones 1994). Several well-known theories, in particular, the punctuated equilibrium theory and advocacy coalition framework, use the subsystem setting to study policy change (Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993). According to the punctuated equilibrium

theory, when new information enters the subsystem, problem definitions can change leading to policy change (Baumgartner and Jones 1993). Baumgartner and Jones (1993) use the example of nuclear energy to illustrate this point as discussed earlier in this chapter. Likewise, the advocacy coalition framework states that as members of a coalition (similar to a subsystem) learn from one another, policy change will result (Sabatier and Jenkins-Smith 1993). A commonly used example of the advocacy coalition framework is climate change policy (see Liftin 2000 and Sewell 2005). As policy elites learned more from one another about the causes and consequences of climate change, policy changed in a reflection of that new knowledge.

SUPPLY, PRIORITIZATION, APPLICATION

The pluralistic theory of information suggests that within a given subsystem, each actor competes to supply information to policymakers in an effort to define the problem in his or her favor, thereby structuring future debates and potential solutions. The oversupply of information resulting from this competitive atmosphere must be prioritized by congressional committees. Only those information suppliers receiving attention have the potential to influence the problem definitions and debates. As you can see, there are three basic components in this pluralistic context: supply, prioritization, and application.

The first component of information processing, the supply of information, is characterized by providers of information competing to supply information to congressional committees on a given topic or policy. Information prioritization is the process of determining which sources of information receive attention and which are ignored by the committees. The third part of information processing is the application of information—applying what Congress learned from the prioritized sources to the

actual policy process. For this project, the discussion of the application of information is limited to the problem definition stage of the policy process.

Supply of Information

Subsystem actors such as, interest groups, bureaucratic agencies, and sub-national governments competing to provide information to Congress in order to influence policymaking characterizes the information supply process. All of these actors are motivated to supply information with the intent to influence problem definitions and policy making in a specific issue area (Workman, Jones, and Jochim 2009; Baumgartner and Jones 1993; Jones and Baumgartner 2005). An advantageous problem definition means the problem will not only be discussed in a beneficial light, but the solutions will also be structured in a way most likely to benefit the actor (see Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993; Jones and Baumgartner 2005; Kingdon 1984). Localities, for example, often supply information in hopes of promoting their interests. In the EISA 2007 example states and localities both were eager to share information with Congress in an effort to define the energy problem as a need to be independent of fossil fuels. Independence from fossil fuels would mean less drilling and more subsidies for local governments. Less drilling would benefit states like Alaska and Florida, while subsidies favored localities interested in increasing their energy budgets. However, different subsystem actors, sub-national governments, federal bureaucrats, and interest groups, vary in their underlying motivations for sharing information.

State and Local Governments as Information Suppliers

State and local governments often share information with Congress in an effort to garner more programmatic and fiscal assistance (Pelissero and England 1987). Often individual actors from state and local governments, such as state legislators and mayors,

testify before Congress to represent their local constituents' interests. Sub-national government associations, such as the National Governors' Association, the National League of Cities, and the National Conference of State Legislators, provide information on behalf of these governments more generally. Both individual actors and these broader associations often provide information to help combat problems lower governments face in the federalist system (Pelissero and England 1987). By providing this information, states and localities can influence the policy making process in Congress (Pelissero and England 1987).

Interest Groups as Information Suppliers

In general, the most important goal of an interest group is to influence the government towards their policy preferences. Providing information to Congress is an effective way of achieving that goal (Kingdon 1984; Smith 1995; Burstein and Hirsh 2007). Second only to lobbying, testifying at congressional committee hearings is the most effective way for interest groups to present Congress with information (Nownes 2001). In fact, because hearings have a wider audience, they may be a more efficient way for interest groups to disseminate information.[4] Further, interest groups see testifying at hearings as an indicator of access to Congress (Leyden 1995) and influence on policy making (Burstein and Hirsh 2007; Laumann and Knoke 1987). Interest groups that can supply the information that is most desired by Congress are most likely to be invited to testify (see Leyden 1995 and Esterling 2004).

[4] Leyden (1995) and Wright (1996) point out that hearings are often designed to reflect information gained in private. Several authors note that hearings allow for a broad audience outside of committee members to receive information (see Kingdon 1984; Gromley 1998; Burstein and Hirsh 2007).

Federal Bureaucrats as Information Suppliers

Federal bureaucracies are valuable sources of information in the policy-making process. They routinely collect information that aids in not only implementation decisions, but also throughout the policy process. There are three broad reasons why bureaucratic agencies share information with Congress: they are forced, they volunteer, or because they were designed to do so. In the first instance, legislative oversight of the executive branch can require bureaucracies to share information with Congress whether or not bureaucrats are willing. Often a bureaucracy is eager to share information with Congress in an effort to influence public policy, by expanding agenda control (see King 1997) or by increasing its budget (Dery 1984). Finally, many bureaucracies have been established for the singular purpose of generating information (Carlson 2011; Workman 2015).

The Energy Information Administration (EIA), the Economics and Statistics Administration (ESA), and the National Center for Health Statistics (NCHS) are examples of bureaucracies that were created for the purpose of generating information, specifically information regarding policy surveillance (see Feldman and March 1981) and the definitions (and importance) of problems (see Katzmann 1989 and Workman 2015). The EIA, for instance, is tasked with the collection, publication, and analysis of a large variety of measures of the state of energy policy. The ESA and NCHS provide a similar service in the economic and health care policy areas, respectively.

Prioritization of Information

The pluralistic perspective of information supply suggests that subsystem actors, such as interest groups, federal bureaucrats, states, and municipalities, will compete to supply information to Congress to define policy problems and steer policy debates (Baumgartner and Jones 1993; Jones and Baumgartner 2005; Workman, Jones, and

Jochim 2009; Baumgartner and Jones 2015). In this competitive environment, an actor chooses not to withhold information for fear of allowing opponents the opportunity to define the problem and structure the debate (Simon 1983; Workman, Jones, and Jochim 2009). The competition to supply information leads to an oversupply of information available to Congress (Simon 1983; Workman, Jones, and Jochim 2009; Jones and Baumgartner 2005). Rather than utilizing a narrow, expert search for information, Congress must prioritize abundance of available information.

Committees, as the information processing mechanisms of Congress (see Krehbiel 1992), filter and prioritize the information. Committees represent not just the information processing arm of Congress, but also the information processing hub of the subsystems. Congress relies on committees to communicate with subsystems. Congressional committees filter the supplied information and share that information with the full chamber. In addition, committees are able to represent the policy preferences of the chamber to the subsystem. Likewise, subsystems depend on committees to communicate with the full chamber. Committees via hearings are able to share both committee and subsystem knowledge and preferences (see Diermeier and Feddersen 2000).

Congressional Hearings

Hearings offer congressional committees a great way to obtain the information necessary for policy making (see Kingdon 1981; Gromley 1998; Burstein and Hirsh 2007). Committees call subsystem actors (ex. federal bureaucrats, interest groups, state governments) to testify and provide information about a given issue area. Those actors testifying at hearings represent the information priorities of the committee.

Committees, witnesses, and the congressional chamber as a whole value committee hearings and the role they play in information processing. The hearing testimony helps define problems, structure the solution space, and draft legislation (Davidson, Oleszek, and Lee 2008). The importance of hearings is further evidenced by committees' willingness to spend money, devote staff resources, and give up personal time in order to hold a large number of hearings each year (Diermeier and Feddersen 2000; Oleszek 1989; see also Jones and Baumgartner 2005). The fact that individual members of Congress frequently testify at committee hearings to share information and help shape the policy debate is further evidence of the value of hearings to Congress (Diermeier and Fedderson 2000). Interest groups and other elites testify at hearings as a way to influence policy making (Kingdon 1984; Smith 1995; Burstein and Hirsh 2007; Laumann and Knoke 1987) and promote their interests (Schlozman and Tierney 1986). In fact, Leyden (1995) argues that interest groups testifying is a clear indication of them having gained access. Last, the hearings process is an effective way for committees to broadcast private information to the entire chamber (Diermeier and Feddersen 2000). Considering C-SPAN and other media coverage, committee hearings make the private information held by committee members and witnesses widely known.

Given the limited resources, especially time, congressional committees must decide on which information they deem important and attend to it while ignoring everything else. How congressional committees prioritize information is based on their goals of constituency service, making good public policy, or gaining power and prestige.

Prioritization by Congressional Committees

Congressional committees are organized substantively by policy topic (ex. House Committee on Small Business and House Committee on Energy and Commerce) as well

as by function—authorization, appropriations, budgeting, and rules. Committees differ not just in their policy-making jurisdictions and roles, but also by their attraction to members of Congress. Previous studies (Fenno 1973; Deering and Smith 1997) suggest that a member of Congress will request a particular committee given his or her top priority—reelection through constituency appeals, power and prestige within the chamber, or making good public policy. The self-selection of members into committees for one of these three reasons (constituency service, power, or public policy) leads to each committee having one dominant goal.

Representatives from agriculture-producing districts concerned with constituency service will request appointments with the House Agriculture Committee (Fenno 1973; Deering and Smith 1997). As a result, the House Agriculture Committee will have one dominant priority—constituency service. Representatives most interested in achieving public policy goals will seek out committees to facilitate their endeavors (Fenno 1973; Deering and Smith 1997). A representative interested in education policy, for instance, will seek a position with the House Committee on Education and the Workforce. The third type of committee is the power committee. Members of Congress most interested in power and prestige within their chambers seek appointments to power committees (ex. House Committee on Appropriations) (Fenno 1973; Deering and Smith 1997). Because the majority of a committee's members chose that particular appointment for the same purpose—constituency service, policy, or prestige, each committee has one dominant goal. That goal structures how a given committee prioritizes information. For example, constituency committees are most likely to prioritize information from constituents and clientele as well as information that can facilitate their goals of constituency service.

Even within the same policy area, committees are often interested in different dimensions of the problem that are reflective of their goals of service, policy, or power. Table 2 offers an example of a hearing held by each committee type on the same public law, Energy Independence and Security Act of 2007 (PL 109-140). Even though the committees were working on the same policy, they were interested in different aspects of the problem and presumably different types of information.

Table 2: Examples of Hearings by Committee Type Related to the Energy Independence and Security Act of 2007

Committee Type	**Example of a Congressional Committee Hearing on EISA 2007**
Constituency	Examines the economic impact of rising energy costs and resources that are available to small businesses[5]
Policy	Examines the efforts of the automobile industry to develop fuel-saving technologies and vehicles[6]
Power	To examine efforts to reduce dependence on foreign oil and promote energy independence and security through increased efficiency and conservation[7]

In this EISA of 2007 example, you can see that a constituency committee (House Committee on Small Business) focused on the energy resources available to small businesses. At the same time, a policy committee (House Committee on Energy and Commerce) was interested in the automobile industry and its ability to create new, fuel-efficient vehicles. A power committee (Senate Committee on Appropriations), was interested in different ways to encourage energy conservation and production to limit

[5] House Committee on Small Business: Full Committee Hearing on Small Business Energy Priorities on October 17, 2007 (ProQuest 2015).

[6] House Committee on Energy and Commerce (Subcommittee on Energy and Air Quality): Hearing on Climate and Energy Security: Perspectives from the Automobile Industry on March 14, 2007(ProQuest 2015).

[7] Senate Committee on Appropriations (Subcommittee on Energy and Water Development): Hearing on Energy Security and Oil Dependence—Recommendations on Policies and Funding to Reduce U.S. Oil Dependence, Special Hearing on May 8, 2007 (ProQuest 2015).

U.S. dependence on foreign oil. Generally, it seems that while these three committees were concerned with rising energy costs and conservation efforts, they were each attending to a different attribute of the problem. It follows that their information priorities are driven by their goals in two ways. First, a committee's goals lead them to have coalitional preferences for information providers (Fenno 1973). For example, constituency committees prefer information from their constituents and clientele; whereas, power committees prefer information from other power actors, such as fellow members of Congress and high-ranking federal bureaucrats. Second, from a practical standpoint, committees need information that is relevant and can help them achieve their goals of service, policy, or power. For example, the House Committee on Small Business may favor small business owners given their unique knowledge of relevant problems and policies.

Application of Information

The final component of information processing, application of information, occurs when congressional committees take the information gained from prioritization and apply it in the problem definition stage of the policy process. When problem definitions change, we are likely to see policy change in response (Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993). There are a number of examples of new problem definitions leading to policy change, including the nuclear energy example discussed above, climate change (see Liftin 2000 and Sewell 2005), and the death penalty (Baumgartner, De Boef, and Boydstun 2008). A more recent example is that of same-sex marriage. As the problem has been re-defined in terms of equal rights rather than in terms of morality, we have seen major policy changes in a relatively short period of time.

Actors, such as bureaucrats and interest groups, want to share information to further their interests. These actors supply information in a competitive context, resulting in an oversupply of subsystem-generated information that must be prioritized by congressional committees (Jones and Baumgartner 2005; Workman, Jones, and Jochim 2009). Information is prioritized depending on a number of factors including the three highlighted in this study: the goals of the congressional committee, the policy area, as well as the presence of problem uncertainty (all of which will be discussed in detail the next chapter).

By supplying information to congressional committees, bureaucrats, and other subsystem actors have the potential to influence congressional actions, including defining problems and advocating for certain policies (Kingdon 1984; Baumgartner and Jones 1993; Smith 1995; Burstein and Hirsh 2007). The more attention a subsystem actor gains, the more likely it will be able to influence committee actions as evidenced by another example from Energy Independence and Security Act of 2007 (EISA). One of the biggest components of EISA 2007 was an increase in the Corporate Average Fuel Efficiency (CAFE) standards, the first statutory increase since 1975 ("Details…" 2007). The new CAFE standards required automakers "to meet a minimum fleet wide fuel efficiency standard of 35 miles per gallon" by the year 2020 ("Details…" 2007).[8] The increase in CAFE standards was particularly troublesome for American auto manufacturing companies than for some foreign automakers, such as Toyota, already exceeded then-current CAFE standards (Automotive News 2007).

These foreign automakers and the Association of International Automobile Manufacturers (AIAM) were actively working *with* Congress to increase CAFE

[8] The new CAFE standards are roughly a 40 percent increase over the then current standards ("Details…" 2007)

standards[9] (Automotive News 2007). In addition, several corporations and the Energy Security Leadership Council, which included airline companies and investments firms among others, pushed Congress to increase CAFE standards (Ackley 2007).

On the other side of the debate, the American automobile industry sought to redefine the problem by reweighting its dimensions, specifically by placing greater emphasis on issues of the free market rather than on oil independence. The American automobile industry and their supporters[10] highlighted the importance of the free market economics. The automakers provided information that illustrated the usefulness of diverse fleets in lowering auto emissions (Ackley 2007; Dingell 2006). Auto Alliance (an automobile manufacturers' trade association), in particular, argued that energy independence and security would best be achieved, especially in free market terms, by offering a range of diverse vehicles, powered by a variety of fuels and allowing supply and demand to take over (Ackley 2007). Unfortunately for the American automobile industry, they were not able to reweight the issue in their favor. The information supplied by the diverse coalition of foreign automakers, AIAM, the airline industry, and investment firms was able to move Congress to increase CAFE standards for the first time in three decades.

As evidenced in this example, subsystem actors are eager to provide congressional committees with information in an effort to influence the policy-making process. The result of groups and bureaucrats competing to supply information is an oversupply of information. This oversupply of information is congruent with the

[9] While these automakers supported increases to CAFÉ standards, some were opposed to Congress being the one to set the new levels. In particular, Toyota supported increases to CAFE standards, but wanted those increases to be determined by the National Highway Traffic Safety Administration rather than by congressional statute (Ackley 2007).

[10] Most notably, United States Representative John Dingell, Jr. (D-MI) (Dingell 2006; Dennis 2007; "Details…" 2007).

pluralistic perspective of information processing (Simon 1983; Kingdon 1984; Laumann and Knoke 1987; Baumgartner and Leech 1998; Esterling 2004; Jones and Baumgartner 2005; Workman, Jones, and Jochim 2009). Much of the policy-making power of both bureaucrats and interest groups is a result of information sharing in the subsystem setting.

Subsystem actors are aware that valuable, quality information is more likely to be rewarded with congressional attention and compete with one another to provide it (Simon 1983; Jones and Baumgartner 2005; Esterling 2004; Workman, Jones, and Jochim 2009). The limited nature of the hearings process exacerbates the competition to supply information. Members of Congress have limits on both their time and resources, the more time and resources they devote to hearings the less they have available for floor debates and action (Jones and Baumgartner 2005). Further, within a given hearing, these same resources are limited, meaning attention granted to one interest group or bureaucratic agency means attention is less likely to be granted to another (Simon 1983; Jones and Baumgartner 2005). Those sources of information that are prioritized by Congress via become much more likely to influence problem definitions and policy outcomes.

Chapter 3: A New Approach to Information Prioritization

Information processing varies depending on the issue context, dimensionality of the problem, availability of information, and the goals of suppliers. The pluralistic theory of information explains information processing in problem-space politics or situations with high problem dimensionality and high levels of available information supplied in a competitive supply environment. Solution-space politics, situations with well-defined problems and limited, costly information supplied in an incentive-based environment, are best characterized by the economic theory of information. The two theories suggest that there are different strategies for collecting information. In the first case, Congress is most likely focused on prioritizing an oversupply of information. In the second context, Congress uses a narrow, expert search strategy to solicit the necessary information.

Congressional committee's strategies for gathering information, especially information prioritization, are at the heart of this project. The pluralistic information theory of information processing informs the research questions herein. The oversupply of information available to congressional committees requires that they prioritize information suppliers, choosing to grant access to some sources of information while denying others. Gaining access, supplying information via congressional hearings (see Leyden 1995), allows subsystem actors to help define problems, structure debates, and influence the policy process. A better understanding of the prioritization process of congressional committees will provide insight into committees' information preferences and the ability of subsystem actors to supply information and influence the policy process. How do the information preferences of committees differ by policy area, committee goals, and uncertainty? Do federal bureaucrats have an advantage in the

information supply process? How do congressional committees make tradeoffs between information suppliers when engaged in information prioritization? When do non-bureaucrats appear to have an information advantage?

This chapter is organized to present the questions posed above and the research design behind their exploration. In the first of the two sections that follow, three important factors for determining committees' information preferences are identified: policy area, committee goals, and problem uncertainty. The latter half of this chapter outlines the research design and data used to address each of these questions on committees' prioritization processes, advantaged suppliers, and information tradeoffs.

INFORMATION PRIORITIZATION

Congressional policy making requires information. The oversupply of subsystem-generated information in problem-space politics means that Congress's task is not soliciting for information but rather prioritizing the abundance of available information. That is, Congress must decide what to attend and what to ignore. In this dissertation, I argue that committee hearings act as the prioritization mechanism for filtering information because not only do members of Congress see hearings as an efficient way to gather information (see Kingdon 1981; Gormley 1998; Burstein and Hirsh 2007), but also hearings are a vehicle through which Congress and policy subsystems communicate. By inviting certain subsystem players to testify at hearings and not others, committees select what information to attend and what information to ignore.

Figure 2 shows the three components of information processing in problem-space politics and the key determinants of each. The supply of information is characterized by competition among actors (ex. bureaucrats and interest groups) to

supply information to Congress (Workman, Jones, and Jochim 2009; Simon 1983; Jones and Baumgartner 2005). The prioritization of information, the focus of this project, is determined, in part, by the policy area, the committee's goals, and the presence of problem uncertainty. How a committee prioritizes information is important given the third component of information processing, the application of information. Information prioritized and attended to by the committee can be applied to the policy process, specifically at the problem definition stage, and can greatly influence policy outcomes. In short, prioritized information helps committee define problems, and those problem definitions will structure which policy solutions will be available at later stages of the policy process (Jones and Baumgartner 2005; Baumgartner and Jones 1993; Kingdon 1984).

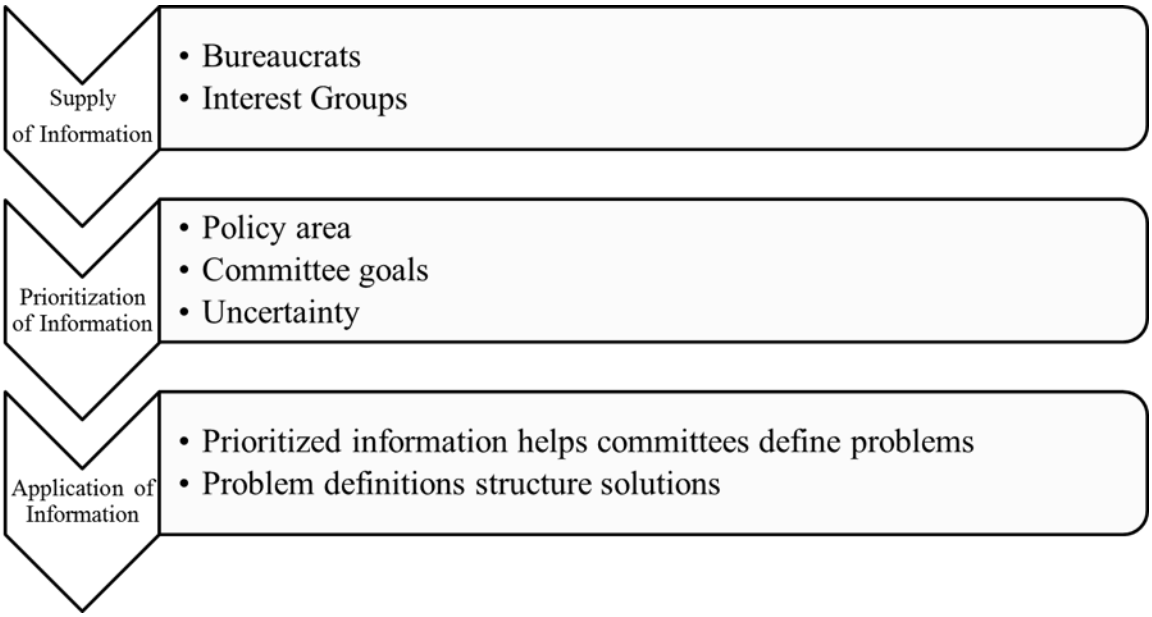

Figure 2: Three Stages of Information Processing in Congressional Committees

Most studies of information in the policy process concentrate on the sources of information (see Miller 2004), but the prioritization or receptivity matters as well. Congressional committees prioritize subsystem-generated information based on three key factors, policy area, committee goals, and the presence of problem uncertainty.

Information Prioritization by Policy Area

Few would argue that the factors (ex. subsystem actors, policy preferences) that drive policy changes are the same in all issue areas. Grossman (2013) finds that policy areas differ in a number of ways, including the venues in which policies are enacted and the composition of relevant actors. For issue areas like energy, for example, policy change is disproportionately administrative-driven (Grossman 2013). Federal bureaucrats should be highly influential in an area like energy. Health care, in contrast, is much more likely to be changed as a result of legislative enactments in Congress (Grossman 2013). Policy change in domestic finance and commerce is likely to originate in both Congress and the courts (Grossman 2013). Policy areas in which change is most likely to occur in Congress or in multiple venues allow for a more diverse group of actors, including, a broader group of legislators, interest groups, and federal judges.

The types of actors included in policy making in a given area also depends on the dominant weights used in the issue area. Some issues are considered low dimensional not because they are necessarily well-defined in terms of their attributes, but because their problem attributes are weighted largely by ideology or party preferences (see Poole and Rosenthal 1997; Jochim and Jones 2013).[11] Partisan coalitions (both liberal and

[11] Jochim and Jones (2013) use roll call votes coded according the Policy Agendas Project's policy areas to calculate the dimensionality of policy areas using roll call data and Poole and Rosenthal's (1997) NOMINATE scores. The Policy Agendas Project's coding scheme is also utilized in this study so the findings for dimensionality can be directly applied to this project. (My use of the Policy Agenda's

conservative) are likely to be highly prevalent in supplying information in policy areas that are evaluated in terms of ideological or partisan weights.[12] In a similar vein, some issues, like energy, are characterized by high dimensionality.[13] For these issue areas, problem dimensions are weighted by party preferences as well as those specific to particular regions[14] or clientele groups. Representative John Dingell's (D-MI) reluctance in 2007 to increase fuel efficiency standards on automakers in his home state is an example of clientele preferences at odds with party and ideological preferences (Dingell 2006; Dennis 2007; "Details…" 2007). Similarly, Senator Harry Reid (D-NV) and the Democratic delegation from Nevada has opposed their party's efforts to establish Yucca Mountain as a nuclear waste disposal site because of regional preferences ("Plan…" 1995; "Nevada…" 1998). Because the weights of problem attributes are more difficult to establish in these high-dimension issue areas, Congress must prioritize information from a wider range of actors, including clientele, states and localities, and individual constituents, to winnow problem dimensionality.

Another way to differentiate between policy areas is by their publics or active members of their subsystems (see May 1991). May (1991) looks at differences between policies with publics or large, diverse subsystems and those without publics or small, limited subsystems. A policy with a public has a large number of actors within it subsystem that compete to supply information (May 1991). In these policy areas, a more diverse group of information suppliers will be successful in providing information

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Project's coding scheme (and the coding scheme itself) will be discussed in further detail later in this chapter.)

[12] Labor and employment, housing, and macroeconomic policies are other areas that are characterized by low dimensionality (see Jochim and Jones 2013).

[13] Agriculture, Trade, and Science policies are also examples of issues that are characterized by high dimensionality (see Jochim and Jones 2013).

[14] See May, Sapotichne, and Workman (2006) and their work on policy coherence in regional policy domains.

to Congress. These policy domains often regard private risks that affect specific groups, which mobilize and supply information to Congress to define problems and steer debates. In U.S. banking regulatory policy, for instance, banks, trade associations, and federal bureaucrats among others are capable of sharing pertinent information to Congress. This diverse range of information suppliers allows congressional committees the opportunity to prioritize information from a variety of sources if they so choose.

Policies without publics, though, have a much smaller number of groups supplying information because these policies tend to focus on public risks, such as natural and technical hazards (May 1991). Information suppliers in these areas, then, tend to be limited largely to scientific and technical experts. In policy areas without publics, a small number of actors has a monopoly on indispensable information, meaning a less diverse set of subsystem actors will be successful in supplying information. For example, policies regarding nuclear energy, perceived largely as a public risk, require a very specialized set of technical information, with the Nuclear Regulatory Commission being one of very few subsystem actors capable of supplying it.

The nature of the policy area influences how Congress attends to different sources of information. Issue areas differ by policy-making venue, some policies are administratively driven (ex. energy) while others are legislatively-driven (ex. health care). Issues can also be separated by the dominate weights used in the issue area and by the substantive information necessary and available for policy making. The nature of the policy area influences whether Congress must rely on a more narrow set of experts or on a broad set of suppliers for information.

Information Prioritization by Committee

Within each policy subsystem, congressional committees must prioritize information. In addition to the policy specific considerations mentioned above, committee goals help shape informaiton prioritization. Chapter Two argued that committees attract goal-oriented members. Those members of Congress most interested in constituency service will be attracted to a committee that can facilitate that service. The same is true for members interested in making good public policy or obtaining power. Each committee is then populated by members who share similar goals if not similar ideological, policy, or outcome preferences. The result is that each ocmmittee has one dominant goal or priority of constituency service, making policy, or gaining power. The dominant prioirity of the committee affects how it prioirtizes subsystem-generated information, in particular, it helps determine which types of information sources testify at hearings.

Representatives from agriculture-producing districts concerned with constituency service request appointments with the House Agriculture Committee (Fenno 1973; Deering and Smith 1997). As a result, the House Agriculture Committee has one dominant priority—constituency service. The fact that the House Agriculture Committee members all share the same goal of constituency service is reflected in the way the committee prioritizes information by giving preference to clientele and constituents at hearings. Representatives most interested in achieving public policy goals seek out committees to facilitate their endeavors (Fenno 1973; Deering and Smith 1997). A representative interested in education policy seeks a position with the House Committee on Education and the Workforce. This type of committee tends to prioritize partisan and group sources of information (interest groups and fellow members of Congress) due to individual members seeking to support their ideological positions on

policy. The third type of committee is the power committee. Members of Congress most interested in power and prestige within their chambers seek appointments to power committees (ex. House Committee on Appropriations) (Fenno 1997; Deering and Smith 1997). Because members of power committees want to illustrate their power in comparison to their colleagues, they likely issue a disproportionate amount of invitations to testify to fellow members of Congress. In addition, these power committees, which typically deal with appropriations and budgets for the federal government, tend to rely heavily on information from federal bureaucrats. Federal bureaucrats are able to supply the most information on the goings-on of the federal government. See Table 3 for an example of congressional committees[15] that held hearings during this time by type (constituency, policy, and power) and the information priorities we should expect for each.

Table 3: Congressional Committee Types, Examples and Information Priorities

Committee Type	Example	Information Priorities
Constitutency	**House Committee on Agriculture**	**Clientele** Businesses Interest groups State and local governments
Policy	**House Committee on Education and the Workforce**	**Coalition** Interest groups Members of Congress
Power	**House Committee on Ways and Means**	**Elites** Bureaucrats Members of Congress

The overarching goal of the committee leads to a general preference for the type of information supplier. Constituency committees, for example, favor clientele and

[15] See Appendix A, Tables A1 and A2 for a full list of all congressional committees testifying in these three policy areas and how they were categorized.

constituency groups, including businesses and state and local governments. Agreement on a goal, such as constituency service, does not mean that the committee members favor the same information suppliers. In fact, members are most likely going to prefer their own constituents and businesses that are influential in their individual districts. Even with disagreement over the specific suppliers, information providers that can support the committees' goals are prioritized over other source types. In policy committees, members' specific preferences will be divided among liberal and conservative interest groups in an effort to support individual policy inclinations, but interest groups as a whole are prioritized more frequently given their value to achieving committee goals.

Information Prioritization and Problem Uncertainty

As mentioned previously, information is necessary for policy making. Information becomes even more important when Congress is faced with problem uncertainty. Problem uncertainty describes when Congress (or a committee) is unsure about the nature of the problem or which problem is the most pressing. Figure 3 shows problem uncertainty across congressional committees as illustrated by the hearings each held. Committee A focuses solely on Problem_1 (only holding hearings on one problem), which illustrates a very low level of problem uncertainty. That is, Committee A has identified the problem and is working to address it. Committee B is splitting attention between multiple potential problems in a given month, depicting a much higher level of problem uncertainty. Committee B is not focused on a specific problem because it is less sure about both the nature and importance of the problems. Low uncertainty means the problem has been identified. High problem uncertainty means the problem is still largely unknown.

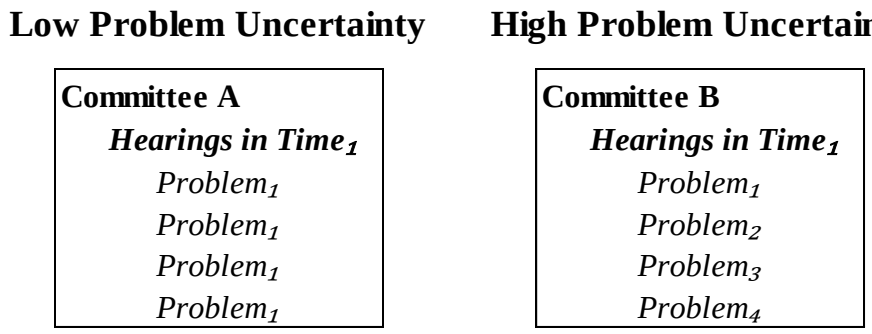

Figure 3: Problem Uncertainty in Congressional Committees

Congress struggling to define (or determine the importance of) a problem is evidence of problem uncertainty in practice. May, Sapotichne, and Workman (2009) find an increase in congressional hearings and the mobilization of subsystem actors for the purpose of gathering information to deal with the uncertainty present in homeland security policy after the September 11, 2001 terrorist attacks. In fact, Lewallen and colleagues (2015) find that about one-quarter of legislative hearings investigate problem definition or importance.

Workman and Shafran (2009) argue that the three most important characteristics of information for alleviating problem uncertainty are accuracy, reliability, and stability. Information must be accurate and factual, at least close enough to the truth that Congress can correctly weigh the importance of the information. Information must also be reliable or consistent. Information provided at $Time_2$ must be consistent with information provided at $Time_1$. Information suppliers must not only be accurate, but predictable. Third, policy makers prefer stable information suppliers who have been and will continue to participate in the subsystem's politics. Information suppliers must have a long-term stake in policy outcomes.

Of all potential sources of information for Congress to choose from, federal bureaucrats have a clear information-supply advantage, given these three preferred characteristics of information. In terms of accuracy, many bureaucracies have been created for the sole purpose of generating information (Carlson 2011; Workman 2015). Further, even if bureaucrats bias information in their interests (King 1997; Dery 1984), Congress can more easily account for their biases than those of other information suppliers. Congress and bureaucracies repeatedly interact throughout the policy process (see Aberbach 1990; Baumgartner and Jones 1993; May, Sapotichne, and Workman 2009; Sabatier and Jenkins-Smith 1993). These repeated interactions alert Congress to any existing biases and allow them to accurately weight the biases in decision making. Further, bureaucracies are created with missions defined by federal statute and often face little to no competition (relative to the private sector). This lack of competition increases the reliability of information because bureaucrats have a set mission and little incentive to deviate from that mission or to provide inconsistent information. In terms of stability, bureaucracies have very long life-spans, especially in comparison to their private counterparts.

Information is necessary to combat the problem uncertainty that exists when Congress is unable to define either a problem or a problem's relative importance. Accurate, reliable, and stable information is most helpful in times of uncertainty. As such, federal bureaucrats have an inherent information advantage over other subsystem actors. When problem uncertainty is high, Congress relies more heavily on federal bureaucrats to supply information.

Differences in policy area, committee goals and the level of problem uncertainty help determine which sources of information Congress prioritizes. Only those sources of information that receive attention from Congress have the opportunity to influence the

problem definition and policy process. A committee is most likely to prioritize those sources with unique information, those that can promote the committee's overarching goal, and those that reduce problem uncertainty.

RESEARCH DESIGN

Subsystem-generated information has the potential to drastically influence the policy-making process. Every year Congress holds 1500-2000 hearings to get the information necessary for policy making.[16] Congressional committees invite businesses, interest groups, state and local governments, and federal bureaucrats to testify and supply the information. By providing information, these actors: businesses, interest groups, bureaucrats, help define problems, set the agenda, and shape public policy. This dissertation looks at the way in which information is gathered across policy areas, by congressional committees, and in response to problem uncertainty as well as how congressional committees adjust their search strategies over time.

Because of the potential for subsystem-generated information to define problems, shape debates, and, ultimately, impact legislation, it is very important to understand how congressional committees choose to gather information. To investigate this new approach of information prioritization in subsystem politics, this project utilizes congressional hearings. Congressional committee hearings offer an opportunity to observe information providers (i.e. bureaucrats and interest groups) and information receivers (congressional committees) interacting in a formal, well-documented setting. The bureaucrats and interest groups want to supply information in order to help define problems and influence the policy-making process (see Baumgartner and Jones 1993; Workman, Jones and Jochim 2009; Simon 1983). The receivers—congressional

[16] See the Policy Agendas Project www.policyagendas.org.

committees—must prioritize all of the possible information providers, deciding whom to attend and whom to ignore. Members of Congress have limited time, resources, and staff and, therefore, are unable to attend to all possible sources of information (see Hall 1987; Oleszek 1989; Jones and Baumgartner 2005). As a result, committees must decide how to allocate their limited attention to a select number of information providers. How committees determine which providers to attend and which to ignore is dependent on three key things: the goal of the committee, policy area, and the amount of uncertainty the committee has about the policy problem.

While committees can get information in a number of ways outside of the hearings process (via lobbying, for example), hearings are a formal statement of the information preferences of the committee. The information preferences exhibited in the committee hearings reflect those exhibited elsewhere by allowing members to publicize the information they have obtained in private (Wright 1996; Diermeier and Feddersen 2000). Further, given that members of Congress routinely testify themselves, they believe that hearings display information to a wide audience (Kingdon 1984; Gromley 1998; Burstein and Hirsh 2007).

Those information providers testifying at congressional committee hearings represent the information that committees have prioritized. In fact, testifying at hearings has been previously used as a measure of access for interest groups (Leyden 1995). In other words, testifying at hearings is a highly visible point at which an interest group, sub-national government, or bureaucracy can successfully present information to Congress.

Research Questions and Expectations

Understanding information processing in policy making is essential for two reasons. First, members of Congress need both policy and political information about a topic for policy making to occur. In the words of Baumgartner and Jones (2015, p. 61), "Information is politics." Second, new information in the system can redefine or reprioritize the attributes of a problem and lead to major policy changes (see Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993).

Subsystem actors—interest groups, bureaucrats, and even states and localities—produce information to supply to Congress in hopes of influencing policy to favor their preferences. The existing theories of policy change—punctuated equilibrium theory (Baumgartner and Jones 1993) and advocacy coalition framework (Sabatier and Jenkins-Smith 1993) show that subsystem-generated information has the potential to define problems, structure policy debate, and shape public policy. Information processing is the process by which information is made available information, prioritized by Congress, and potentially applied to the policy making. How congressional committees filter information—give access to one set of information providers while denying others is at the core of this project. What factors influence the way in which congressional committees filter available information? How do committees make tradeoffs amongst information suppliers? How do information tradeoffs vary by subsystem?

This project is interested primarily in two sets of research questions. The first focuses on the role of bureaucrats as information suppliers. How do committees prioritize the bureaucrats and do their priorities shift given policy area, goals and problem uncertainty? The second set of questions look at tradeoffs between other witness types. How do committees make tradeoffs between witness types? Are certain witness types more or less likely to testify depending on the subsystem?

Prioritizing Federal Bureaucrats

Federal bureaucrats have an advantage in the information sharing process as argued in Chapter Two. The motives for bureaucrats to supply information differ from other actor types. In fact, often bureaucrats are created for the sole purpose of supplying information to policy makers, such as the Government Accountability Office and the Energy Information Administration. Bureaucrats also share a unique, long-standing relationship with members of Congress with many repeated interactions. Chapter Four investigates how bureaucrats are prioritized as informaiton suppliers given their inherent advantages in supplying information to Congress.

Bureaucrats vary in popularity as information suppliers by policy area. In energy policy, for example, bureaucracies, such as the Nuclear Regulatory Commission, are likely to have information that is not readily available from other sources. The same is true for certain agencies in health care policy (e.g. Centers for Disease Control and Prevention). Bureaucratic agencies are less likely to hold private information in a policy area like domestic commerce and banking regulation given the ability of the private sector to produce competing information.

Power committees favor bureaucratic information more than other committee types for two reasons. First, power committees favor political elite, like presidentially appointed bureaucrats, as sources of information given their goals of achieving greater political power. Second, power committees have a shared task of overseeing the federal bureaucracy. No one knows more about the federal bureaucracy than federal bureaucrats. Therefore, power committees invite more bureaucrats to testify than either constituency or policy committees. The following expectations should hold true for federal bureaucrats as information suppliers:

1: The number of federal bureaucrats invited to testify at congressional committee hearings varies by both policy area reflecting the likelihood of bureaucrats having information monopolies.

1a: Bureaucrats are less likely to testify at hearings on domestic commerce than at hearings on energy or health care.

2: Power committees invite more bureaucrats to testify relative to the other committee types because bureaucrats hold information most likely to help committees achieve their goals and complete their oversight tasks.

Bureaucrats have the greatest information advantage when congressional committees face uncertainty about either the nature or the importance of a problem. When confronted with problem uncertainty, congressional committees rely more heavily on those actors with whom they have the longest standing relationships and can most easily account for any possible bias—federal bureaucrats.

The bureaucrats' information supply advantages are magnified for careerist bureaucrats. Careerist, as opposed to presidential appointed, bureaucrats often work for the federal government for decades and are likely to have repeated interactions with congressional committees during their careers. Their expertise and extensive experience means that in the presence of problem uncertainty committees will rely heavily on careerist bureaucrats in particular. The following expectations should hold true for bureaucrats given their unique ability to help committees cope with uncertainty.

3: All committees with problem uncertainty prioritize bureaucrats as sources of information.
3a: Careerist bureaucrats are more preferred than their presidentially appointed counterparts during times of uncertainty because of greater levels of expertise and longer relationships with congressional committees.

These first sets of expectations regarding the prominence of federal bureaucrats testifying at congressional committee hearings will be further discussed and explored in Chapter Four. Findings suggest that bureaucrats do have an information advantage over other information providers, particularly when congressional committees are responding to problem uncertainty.

Information Tradeoffs in Energy Policy

The second look at information prioritization addresses the tradeoffs congressional committees make across information suppliers in energy policy. Energy policy is the most multidimensional issue area included in this study (see Jochim and Jones 2013). The multidimensionality of this policy area means that there is the potential for a wider range of problem definitions and types of actors. As discussed earlier, preferences in energy policy are driven not only by ideological and partisan concerns, but also by concerns for constituents, clientele, and region.

Within energy policy, subsystem actors generate information to supply to congressional committees. Each committee must filter through the barrage of subsystem-generated information. The goals (constituency service, power and prestige, or public policy) of each committee determine which sources of information are most likely to receive attention.

Constituency committees prioritize information generated by businesses, interest groups, state and local governments, and individual constituents. These four groups are most likely to represent the committees' clientele and constituents. Policy committees pay most attention to interest groups and members of Congress because these witness types are most likely to provide the information to reinforce previously held policy positions. Power committees prioritize information generated by bureaucrats and

members of Congress because these witnesses provide the most information on the inner workings of the federal government as well as reinforce the prestige and power of these committees.

> 4: The dominant goal of the committee determines how it filters subsystem-generated information—which sources of information receive attention and which do not.

Committees can only choose to prioritize available information. Some policies, those with publics, have a greater number of actors capable of supplying information than those policies without publics. For policies with publics, the individual motivations to supply information are high given the risks are private. For policies without publics, individual actors are less motivated to supply information, either due to an inability or because the problem is perceived to be a public risk and does not pose a direct theory to any specific actor.

> 5: The subsystem actors that are capable of supplying information vary by specific policy area.
> 5a: Policies with publics have more diverse set of actors competing to supply information so committees are able to prioritize a wider range of actors.
> 5b: Policies without publics have limited set of actors supplying information so committees are limited to the groups they can prioritize, usually bureaucrats or other technical experts.

How congressional committees make information tradeoffs in energy policy will be explored in Chapters Five and Six. Findings suggest that committees have distinct information preferences that vary by their goals, especially in terms of bureaucrats and businesses. Their information preferences also appear to vary by the specific energy issue being addressed.

Data: Collection and Coding

To study how congressional committees prioritize information in the subsystem setting, this project looks at which information providers testify at committee hearings. Those testifying represent the information prioritized by the presiding committee. Who testifies (provides information) is dependent on the policy area, the committee's goal, and the committee's uncertainty about the problem.

The Policy Agendas Project's[17] Congressional Hearings Dataset was used as an index[18] to identify all hearings on domestic commerce, energy, and health care policy areas. The Policy Agendas Project uses a content coding scheme, which is consistent both over time and across institutions. In this dataset, each hearing is coded based on its description for a major topic area (ex. Energy) and a specific minor topic area (ex. Coal). See Table 4 for a clear description of the domestic commerce, energy, and health care topic areas and the minor topic areas for each according to the Policy Agendas codebook.[19] As you can see, each policy area covers a wide range of topics. Domestic commerce, for instance, covers a number of policy topics, including banking regulation, consumer protections, and bankruptcy. The multifaceted nature of each of these three policy areas is an important factor to keep in mind. Energy policy, for instance, covers a

[17] The Policy Agendas Project uses a consistent policy content coding scheme. This coding system allows policy processes to be compared to one another as well as across time. The Policy Agendas Project's major and minor topic codes identify the main or general topic area (e.g., 1 = Macroeconomics) and then the minor or specific subtopic area (e.g., 108 = Industrial Policy). The Policy Agendas Project data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant number SBR 9320922, and were distributed through the Department of Government at the University of Texas at Austin and/or the Department of Political Science at Penn State University. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here

[18] A list of all hearings in domestic commerce, energy, and health care policy using the Policy Agendas Project's Congressional Hearings Dataset was created, which included a CIS identification number for each hearing. Using the CIS number, information on the witnesses testifying was collected. See the discussion on the collection of witness data for more information.

[19] See Appendix B, Table B1 for full listing of the Policy Agendas Project's policy areas used in this project.

multitude of issue areas, including nuclear energy, gas and oil policy, as well as alternative and renewable fuels. Because there are so many ways to debate energy problems, how problems are defined is particularly important. Energy defined by a priority on American oil independence will require a much different solution than energy policy defined in terms of energy conservation and climate change.

Table 4: Issues Covered by Policy Area

Policy Area	Description
Domestic Commerce	Banking, finance, and domestic commerce policy, including the regulation of the U.S. banking and financial systems, consumer finance, bankruptcy, tourism, and small business issues
Energy	Energy policy, including nuclear, gas and oil, electricity/hydroelectricity, coal, and alternative and renewable energy
Health	Health care policy, including comprehensive refrom, regulation of drug and medical device industries, disease prevention, mental health, long term care, and drug, tobacco, and alcohol abuse.

These three policy areas offer both a wide variety of actors and congressional committees. The committees with jurisdiction in health care and domestic commerce differ from those involved in energy. The same can be said of those actors—interest groups, businesses, and bureaucrats—invited to testify in the three different policy areas. In addition, these three policy areas differ in terms of political context (Jochim and Jones 2013). Energy is a multidimensional policy area determined by partisan as well as distributive politics (Jochim and Jones 2013). Conversely, health care is a unidimensional policy area in which policy change can be largely explained in terms of partisanship (Jochim and Jones 2013). Domestic commerce policy in recent years has

been trending from a multidimensional policy area to one more accurately characterized as unidimensional (Jochim and Jones 2013). The selection of energy, health, and business regulation policy areas allows for the comparison of the information prioritization processes in a variety of political contexts and subsystems.

Using the Policy Agendas Project's Congressional Hearings Dataset as an index, 4,745 hearings were identified across the domestic commerce, energy and health policy areas.[20] In Table 5 you can see the number of hearings held on each topic area included in this study. Congress held over two thousand hearings on domestic commerce, accounting for roughly 45 percent of the hearings in this dataset. Committee hearings on energy make up a much smaller percentage of the dataset, with only 826 hearings during this time frame. Major events during this time frame that demanded considerable congressional attention include the September 11th terrorist attacks, the wars in the Middle East, Hurricanes Katrina and Rita, two major energy bills in 2005 and 2007, respectively, the financial crisis of 2008, and the first two years of the health care reform debates.

Table 5: Number of Congressional Committee Hearings by Policy Area, 1995-2010

Policy Area	Frequency	Percent
Domestic Commerce	2101	44.28
Energy	826	17.41
Health Care	1818	38.31
Total	4745	100

[20] The number does not include hearings held by Joint Committees or temporary committees. Also excluded were hearings with no witnesses and two extreme outliers.

To measure which information providers are prioritized, all witnesses (33,090) were collected from ProQuest.[21] See Table 6 for a summary of the number of witnesses testifying in each topic area during the 1995-2010 time frame as well as the average number of witnesses per hearing for each topic area. As you can see, the average number of witnesses is very consistent across domestic commerce, energy, and health policy areas included in this study with roughly seven witnesses testifying at a given congressional hearing. The range of witnesses testifying at hearings in this dataset ranges from 1 to 71.[22]

Table 6: Number of Witnesses Testifying at Congressional Committee Hearings by Policy Area, 1995-2010

Policy Area	Total Number of Witnesses	Average Number of Witnesses per Hearing
Domestic Commerce	14461	6.88
Energy	5759	6.97
Health Care	12870	7.08
Total	**33090**	**6.97**

Finally, each witness was then coded according to his or her affiliation, whom he or she was representing. There are five major categories of witnesses: public institutions, government, businesses, interest groups, and "other". Each of these major categories has multiple subcategories. The government category, for example, has three subcategories: federal bureaucrats, members of Congress, and states and localities.

[21] "ProQuest Congressional Publications." ProQuest LLC, 2015. The CIS numbers provided by the Policy Agendas Project's Congressional Hearings dataset were used to locate the full hearing information for each entry using ProQuest. Once each hearing was located using ProQuest, all witnesses testifying at the hearings, their affiliations, as well as several additional hearing-specific variables were collected.

[22] If the two extreme outliers are included and those hearings with no witnesses, the actual range is 0 to 168. Two hearings on the Energy and Water Development Appropriations for 1996 CIS 95-H181-48 and 95-H181-49 had 133 and 168 witnesses testifying, respectively. These two hearings were dropped form the analysis given that they were both such extreme outliers.

Additionally, each federal bureaucrat was coded for whether he or she was a careerist or a presidential appointee. See Table 7 for a brief summary of witness types. [23]

Table 7: Coding Scheme for Witnesses Testifying at Congressional Committee Hearings

Witness Types
Public Institution
Hospitals
Schools
Government
Federal Bureaucracies
Presidentially Appointed
Careeriests
Members of Congress
State and Local Governments
Business
Big Businesses (>1,000 Employees)
Small Businesses (<1,000 Employees)
Interest Groups
Nonprofits
Trade Associations
Professional Associations
Unions
Other
Other
Individuals
Native Americans
Foreign Countries
Other/No Idenification

In addition to the witnesses testifying at congressional committees, the dependent variable of this study, there are two important independent variables that warrant attention: committee goals and problem uncertainty. Besides the influence of

[23] This coding scheme is loosely based off of the work by Heinz, Laumann, Nelson, and Salisbury (1997), which categorized different organization types active in agriculture, energy, health, and labor policy domains (p. 63). See Appendix C, Table C1 for a detailed discussion of the coding scheme.

policy area on committees' information preferences, a committees overarching goal and the presence of problem uncertainty should impact which sources of information are invited to testify and which are ignored. The discussion below details how committee goals were determined and problem uncertainty measured.

As discussed earlier, members of Congress select committees based on an individual priority—constituency service, making good public policy, or gaining power or prestige in the chamber (Fenno 1973; Deering and Smith 1997). As a result of this self-selection, each committee has one shared goal. Based loosely on Fenno (1973) and Deering and Smith (1997), committees were categorized into three types—constituency, policy, or power and prestige—based on their goals. Constituency committees are those whose shared goal is reelection via constituency service. Members of policy committees have a common goal of making good public policy though individual policy objectives may vary greatly. Power committee members have a mutual goal of gaining power and prestige within their chamber. The shared goal of a given committee influences how it prioritizes information. For instance, constituency committees, like the House Small Business Committee, favor information from constituents or clientele, such as the National Small Business Association. Policy Committees favor members of their partisan coalitions (ex. interest groups and partisan elites); whereas power committees favor political elites (ex. bureaucrats and members of Congress).

In addition to these three committee types originally introduced by Fenno (1973), Deering and Smith (1997) introduce a fourth, "mixed committees." To account for Deering and Smith's (1997) "mixed committees", such as the Senate Committee on Small Business, I use the committees' websites and recent activities to determine its category according to Fenno's (1973) tripartite coding scheme. The Senate Committee

on Small Business's web page[24] shows a clear devotion to constituency service; whereas, public policy seems like a secondary consideration. Therefore, the committee is categorized as a constituency committee. I also deviate from Deering and Smith (1997) by having power committees in the Senate.

Table 8: Examples of Congressional Committees by Type

Constituency Committees		**Policy Committees**		**Power Committees**	
House	***Senate***	***House***	***Senate***	***House***	***Senate***
Agriculture	Armed Services	Commerce	Banking	Budget	Appropriations
Small Business	Indian Affairs	Education	Health	Ways and Means	Judiciary

Adapted from Fenno (1973) and Deering and Smith 1997

See Table 8 for a subset of congressional committees[25] that held hearings during this time by type: constituency, policy, or power. Committees, such as House Committee on Agriculture and the Senate Committee on Indian Affairs, are coded as constituency committees. Members of Congress request these committees to serve their constituents and clientele (Fenno 1973; Deering and Smith 1997). Examples of policy committees include the House Education and the Workforce Committee and the Senate Committee on Banking, Housing, and Urban Affairs. Members of Congress requested these committees to influence policy (Fenno 1973; Deering and Smith 1997). The House Committee on Ways and Means and the Senate Committee on Appropriations are power committees whose members requested membership to pursue power within Congress (Fenno 1973; Deering and Smith 1997).[26]

[24] http://www.sbc.senate.gov/public/

[25] See Appendix A, Tables A1 and A2 for a list of all congressional committees that held hearings in the domestic commerce, energy, and health care policy areas and how each categorized.

[26] Deering and Smith (1997) only list power committees in the U.S. House of Representatives. Here, a few Senate committees have been added as power committees given their important roles in the legislative process. See Appendix A for a complete list and reasoning behind the departures from the existing literature.

Problem uncertainty is the final component of determining how congressional committees prioritize information. To measure problem uncertainty, I used the Herfindahl-Hirschman Index (HHI) which was originally created as a measure of competition in economic markets. The HHI is a measure of the size distribution of companies within a given market. As HHI approaches zero, a market is characterized by a high number of companies of similar size. The HHI increases as a result of two things: (1) a decrease in the number of firms within the market and (2) an increase in the size between the companies.[27]

The Herfindahl-Hirschman Index translates here as a measure of problem uncertainty because when there is no "competition" among possible problem definitions (i.e. topics the committee holds hearings on in a given month) then there is no uncertainty. A committee holds hearings on only one topic because it knows exactly what the problem is and is sure of its importance. Therefore, the committee has little problem uncertainty.

In contrast, when a congressional committee is holding hearings across a number of different topic areas in given month, there is lots of "competition" among problem definitions. This "competition" among problem definitions and problem salience translates to higher uncertainty over the appropriate definition and level of importance to attach to a given problem. High problem uncertainty characterizes a committee that is searching for information across a wide range of potential problem definitions.

To calculate the HHI score to approximate problem uncertainty for each committee for each month, I used all hearings on all 20 policy areas in the Policy

[27] In the past the HHI has been used in political science to measure the jurisdictions of congressional committees (see Baumgartner, Jones, and MacLeod 2000) as well as political competition applied to major parties within a country (see Bardhan and Yang 2004).

Agenda's Project Hearings Dataset from 1995-2010.[28] Using all hearings on all topics to calculate problem uncertainty accounts for the competition among all problem definitions, rather than limiting uncertainty to those definitions routinely used by the three subsystems highlighted in this study. Including all problem definitions in the calculations allows me to better account for both congressional committee attention limits and competing problem definitions that cross policy subsystems. For example, environmental concerns and energy from fossil fuels are two potential problem definitions that are not relegated to a single subsystem.

The following three chapters investigate the supply and prioritization of information in domestic commerce, energy, and health care policy areas. The first of these chapters look at bureaucrats as information suppliers and, specifically, whether or not they have an information advantage in these three policy areas. Findings suggest (1) that congressional committees adjust how they prioritize bureaucrats as information suppliers at hearings depending on the policy area being discussed and (2) as committees become more uncertain about the problem, they rely more heavily on federal bureaucrats, specifically careerists. Both of these findings support the new approach of information prioritization introduced in this chapter. The second finding, the number of bureaucrats testifying increases with committees' problem uncertainty, supports the claim that bureaucrats have an inherent information advantage given their unique relationship with Congress.

The final two chapters look at private sources of information (businesses and interest groups) and public sources of information (bureaucrats, members of Congress, and states and localities) testifying at energy hearings. These chapters focus on when

[28] See Appendix D for more information on calculating the HHI for each congressional committee for each month during the 1995-2010 time period.

different witness types are more or less likely to testify, paying particular attention to the presiding congressional committee and specific issue area. The findings presented in these two chapters do not find additional support for committees' information preferences but do find additional support for the bureaucratic information advantage, especially in times of problem uncertainty. In addition, the findings of these two chapters support the claim that congressional committees prioritize different sources of information in policies with publics than in policies without publics. In short, the findings presented in the next three chapters show support for the new approach to prioritization introduced earlier.

Chapter 4: Bureaucrats as Information Suppliers

Federal bureaucrats play an important role in policy making as policy implementers and as members of policy subsystems, working with interest groups, businesses, and legislators (Kingdon 1984; Salisbury 1984; Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993; Sabatier 1998). In addition to implementing legislation, they also establish policy alternatives (Kingdon 1984), including problem definitions, possible solutions, and policy advocacy, by providing Congress with valuable information.

Much of the research on the federal bureaucracy focuses on bureaucrats as agents of Congress, the president, or both and as policy implementers. There is an abundance of literature dedicated to understanding bureaucrats as implementers (Pressman and Wildavsky 1973; Rein and Rabinowitz 1978; Lipsky 1980; Sabatier 1986; Wilson 1989; Cook 1996) and the ways in which Congress and the president attempt to control them (Moe 1985; Weaver 1987; Epstein and O'Halloran 1999; Balla 1998; Waterman and Meier 1998; Balla and Wright 2001; Worsham and Gatrell 2005). While these studies of implementation and principal-agent theory often allude to the fact that bureaucrats possess expertise and vast amounts of valuable policy information (see especially: Kingdon 1984; Weaver 1987; and Brehm and Gates 1999), there are few studies which focus on when and to what extent bureaucrats supply Congress with information (a notable exception is Miller 2004). This chapter seeks to do exactly that: investigate when bureaucrats are most likely to supply information to congressional committees and how the supply of information changes by committee, across policy areas, and in response to crises and problem uncertainty.

The rest of this chapter is organized into three sections. The first section will provide a review of the three roles of federal bureaucrats: agents of Congress and the president, implementers, and, most importantly for this dissertation, information suppliers. The second section of this chapter will discuss in detail the research questions regarding federal bureaucrats and, more specifically, careerists in the information supply process. The final section will discuss the research and empirical findings on when and to what extent bureaucrats have an advantage in the information supply process.

BUREAUCRATS IN THE POLICY-MAKING PROCESS

The policy specialization and accumulated knowledge of bureaucracies allow them to play a number of roles in the policy-making process as agents of Congress and the president, implementers, and information suppliers. In the principal-agent theory, information asymmetry between Congress (or the president) and the bureaucracy often gives Congress (or the president) a disadvantage because of problems like moral hazard and adverse selection. The principals do not have enough information regarding the policy problem and the actions of the agents, both of which help make controlling bureaucracies impossible and influencing bureaucracies difficult (Brehm and Gates 1999, Moe 1985, McCubbins and Schwartz 1984).

As implementers, bureaucrats use their policy expertise to take laws and translate them into action (Dodd and Schott 1979). Bureaucrats are afforded more discretion as implementers when the members of Congress have little knowledge of an issue area or are require ambiguous legislation to satisfy a compromise. In these situations, bureaucrats are often allowed often allowed greater discretion in the implementation process and, as a result much more power in determining policy outcomes (Huber and Shipan 2002).

Last, as information suppliers bureaucracies can use their accumulated knowledge and policy specialization to help define problems, structure debates, and advocate for specific policy solutions (Kingdon 1984; Baumgartner and Jones 2005). The following section will review the extensive research on bureaucrats in the implementation and principal-agent literatures, paying particular attention to the information asymmetry between bureaucrats and Congress in these contexts. The section will conclude with a discussion of bureaucrats as information suppliers given their inherent information-sharing advantage.

Agents of Congress and the President

In political science, the principal-agent theory is often used to describe the relationship between Congress or the president (the principal) and the federal bureaucracy (the agent(s)). The principal-agent framework is best defined as a top-down approach to studying the bureaucracy, stressing the importance of subordination and compliance to the rules laid forth by Congress (Rein and Rabinovitz 1978). The research in this area is often focused on how congress and/or the president can ensure bureaucratic compliance (Balla 1998; Balla and Wright 2001; McCubbins and Schwartz 1984; McCubbins, Noll, and Weingast 1987; Lewis 2008; Moe 1985) and bureaucratic response to such attempts at control (Brehm and Gates 1999; Golden 2000; Wilson 1989). In this framework, the bureaucracy is characterized as a means to an end (see Cook 1996).

Congress has difficulty controlling the bureaucracy for a number of reasons, including the propensity for passing ambiguous legislation and the inability to monitor bureaucratic actions. Ambiguous legislation (usually as the result of either a series of compromises or a lack of information) allows for agency discretion, taking policy

decisions out of the hands of principal(s) and giving them to the agency (Huber and Shipan 2002; Epstein and O'Halloran 1999).

Congress struggles to control the bureaucracy due to the inadequate resources to monitor the large, complex organizations. Not only would monitoring the federal bureaucracy be extremely difficult, it would also be very costly to acquire the necessary information and resources (McCubbins and Schwartz 1984; McCubbins, Noll, and Weingast 1987). The information asymmetry that exists between Congress and the bureaucracy makes control over bureaucrats even more problematic. Bureaucracies have policy specialization and accumulated knowledge that neither Congress nor the president possess. This information asymmetry is exasperated by problems of adverse selection (the inability of the principal to have full information about the agent) and moral hazard (the inability of the principal to determine if the agent's actions are in the principal's best interests) (Brehm and Gates 1999; Moe 1985).

The principal's moral hazard, the possibility that the principal's goals are self-destructive, is another obstacle for controlling bureaucracies (Miller 2005). Sometimes a decision that seemingly goes against the principal's interests is necessary for reaching long term policy goals (Miller 2005). The solution to this problem is to allow bureaucrats to make policy decisions based on their specialization and accumulated knowledge. When principals are confronted with questions of personal moral hazard or pass ambiguous legislation, then the delegation of policy decisions to bureaucrats is often the only available option for policymaking. In fact, we see proof of this in the implementation literature—when neutrality or additional expertise is needed Congress and the President turn to the bureaucracy (Huber and Shipan 2002).

Given these many challenges to controlling the bureaucracy, it is not in the best interests of the principals to even try to control the bureaucracy; instead Congress and

the president must use their power to influence bureaucratic behavior. The two main ways Congress can attempt to control or influence bureaucratic behavior is through the use of ex post and ex ante controls. Ex post controls are those implemented after the fact, including what McCubbins and Schwartz (1984) term policy patrols and fire alarms. Police patrols are direct forms of oversight in which Congress is actively observing agencies to ensure that each one is acting the way Congress would want (McCubbins and Schwartz 1984). Fire alarms, on the other hand, allow Congress to use rules and procedures in administration that allow citizens and interest groups to patrol agencies and sound an alarm when there is a problem (McCubbins and Schwartz 1984).

Ex ante controls are best understood as the actual agency structure and decision-making process to ensure the best possible outcome and to restrict an agency before it becomes involved in policy making (McCubbins, Noll and Weingast 1989). The use of such ex ante controls allows Congress to create an "early warning" system to alert them when an agency veers off course. Furthermore, adding more decision-making rules provides Congress with extra time if they do need to intervene. An additional advantage of ex ante controls is that it allows Congress to "stack the deck in favor of certain constituents" (McCubbins, Noll and Weingast 1989).

The president, too, has strategies for controlling the administrative branch. Each agency, though, has its own agenda, support base, and knowledge advantage meaning that the president cannot expect control to come easily (Moe 1985; Jones and Williams 2008). In order to achieve responsive competence from the bureaucracy, the president will centralize control in the White House and maximize presidential appointments (Moe 1985). Political appointees represent the greatest source of bureaucratic control for presidents (Lewis 2008). Through the careful use of appointees, the president can shape agencies within his administration (Lewis 2008).

Even though Congress and the president have a variety of tools they can use to direct bureaucratic behavior, often they find that they need to give bureaucrats more freedom to act rather than less. Congress and the president both rely on the bureaucracy to interpret and implement ambiguous legislation, making decisions Congress is either unable or unwilling to make (Huber and Shipan 2002). Bureaucracies are able to assume this responsibility because of their policy specialization and accumulated knowledge. Further, Congress and the president are able to trust them with this responsibility because of their expertise, but also because they are constrained by what Wilson (1989) calls the bureaucratic personality (the agency's standard operating procedures, prior experience, and professional norms).

Implementers

Once legislation is passed, it must be implemented. There are two approaches to studying implementation: top-down or bottom-up. The top-down approach is reflective of the principal-agent framework. This characterization of implementation assumes that once the objectives are set forth in legislation there will be relatively few decisions to be made. The policy will easily be translated into action, achieving congressional policy objectives (Van Meter and Van Horn 1975; Rein and Rabinovitz 1978). However, this approach oversimplifies the process of implementation because legislation is rarely specific enough to allow for it (Rein and Rabinovitz 1978).

The bottom-up approach recognizes the importance of bureaucrats in the implementation process. In this approach, implementation is characterized as a circular, rather than linear, process in which bureaucrats have a significant role in both decision making and implementation (Rein and Rabinovitz 1978). The bottom-up approach is

much more accurate given the frequency with which Congress passes ambiguous legislation.

There are two paths that Congress can take in designing legislation, one that constrains administrators, treating them as merely agents, or one that delegates authority to the bureaucracy (Huber and Shipan 2002). Long statues are usually extremely detailed, meant to micromanage the bureaucracy throughout the implementation process. Ambiguous statues, on the other hand, neglect policy details and give bureaucrats discretion in the implementation process (Huber and Shipan 2002). Giving bureaucrats policy discretion can be, and often is, a deliberate act by Congress. Delegating important decisions to the bureaucracy is often the best strategy for ensuring that the policy is effectively implemented because bureaucrats have both policy specialization and accumulated knowledge (Huber and Shipan 2002). Discretion can also be the result of the inability of the principals to compromise on legislation (Huber and Shipan 2002).

Whether Congress chooses to delegate authority to bureaucrats in the implementation process is depended on a number of things, including the level of policy conflict, legislative capacity in a given issue area, and transaction cost politics (Huber and Shipan 2002; Epstein and O'Halloran 1999). Highly contentious policies are difficult to make detailed for a number of reasons, including inability to compromise and the fear of making a mistake (Huber and Shipan 2002). Further, many times Congress lacks the information necessary to write detailed legislation, especially in issue areas such as energy policy (see Grossman 2013).

In both the principal-agent and implementation literatures, it is repeatedly shown that Congress must delegate many policy decisions to bureaucrats because of their inherent information advantages (Epstein and O'Halloran 1999; Huber and Shipan 2002). Given the importance of the bureaucracy in the implementation stage of the

policy process because of its policy specialization and accumulated knowledge it makes sense that we should also concern ourselves with how this same bureaucratic expertise can impact earlier stages of the policy process, specifically the problem definition stage.

Information Suppliers

Bureaucracies collect information that benefits them not only in making decisions during the implementation process, but also to use at other points throughout the policy process (Workman, Jones, and Jochim 2009; Katzmann 1989; Feldman and March 1981). While research tends to focus on bureaucratic expertise in the two areas previously discussed, federal bureaucrats are involved throughout the policy process, especially during the problem definition stage (Kingdon 1984; Katzmann 1989; Miller 2004; Workman, Jones, and Jochim 2009).

Problem definition is usually considered the first stage of the policy process. It is the process in which a phenomenon is labeled as a problem that requires the government to take some sort of action (see Cobb and Elder 1972; Stone 1989; Jones and Baumgartner 1989; Kingdon 1984). According to the punctuated equilibrium theory major policy change only occurs once congressional attention is shifted to a new issue(s) due to a change in the problem definition or as a result of an exogenous shock (ex. the Three Mile Island accident in 1979) (Baumgartner and Jones 1991).

Both the principal-agent and implementation literatures focus on congressional delegation of policy decisions to the federal bureaucracy. The pluralistic theory of information processing suggests that just as much attention should be shown to the delegation information processing: both the monitoring of the policy environment and the processing of subsequently gathered information (see Workman, Jones, and Jochim 2009). Rather than characterizing the relationship between Congress and the

bureaucracy as predominantly top-down, the information processing perspective stresses the reciprocal aspect of the relationship (Workman, Jones, and Jochim 2009). The federal bureaucracy is seen as a collection of organizations that monitor the policy environment and direct congressional attention to potential policy problems (Workman, Jones, and Jochim 2009; Arrow 1974; Feldman and March 1981; May, Workman, and Jones 2008; Workman 2015).

The information gathered and processed by bureaucracies is often used by Congress to define problems and establish policy alternatives (Kingdon 1984; Miller 2004; Baumgartner and Jones 2005). The Energy Information Administration (EIA) is an excellent example of exactly this type of congressional delegation as it is charged with both policy surveillance (see Feldman and March 1981) and identifying and defining policy problems (see Katzmann 1989). In his study of energy policy failures, Grossman (2013) notes that the EIA was created in 1974 (originally as the Federal Energy Administration) for the purpose of providing Congress with information regarding the energy industry. Likewise, Miller's study (2004) of criminal justice policy shows that bureaucrats play a role in defining policy problems and alternatives in criminal justice policy.

Federal bureaucracies gather information in "surveillance" mode (Feldman and March 1981; Workman, Jones, and Jochim 2009) constantly monitoring changes in the policy environment. The EIA, for example, regularly publishes a variety of measures of the state of energy policy, including the amounts of energy produced and consumed by source and prices by source. In turn, this information can be used to define emerging problems and redefine existing ones (Katzmann 1989; Workman, Jones, and Jochim 2009).

The ability of the federal bureaucracy to gather, process, and disseminate information to direct macro attention is particularly important given the attention limits of Congress. Congress has limited time and resources to make policy. More specifically, members of Congress have attention limits and can only focus on a few problems at any given time (Jones and Baumgartner 2005). Congress relies on subsystem actors, especially bureaucrats to survey the policy environment and alert them to potential problems (Baumgartner and Jones 1993; Feldman and March 1981; Workman 2015). There are an extensive number of agencies created for policy surveillance and information gathering (ex. Energy Information Administration; U.S. Census; U.S. Bureau of Labor Statistics) (Feldman and March 1981).

Rather than describing the relationship between Congress and the federal bureaucracy as a top-down, control-driven process or as a bottom-up, expertise-driven process, it is more accurate to characterize the relationship as reciprocal. Congress needs information for policy making and help with policy surveillance. Bureaucrats need access to policymakers. Bureaucrats provide necessary information and policy surveillance services and congressional committees attend to bureaucrats' messages, frequently inviting them to testify and, thereby, providing them access to the policy process.

BUREAUCRATS AS INFORMATION SUPPLIERS

In order to gather the information necessary for policy making, congressional committees must look to subsystem actors. In instances where problems are well-defined and information is limited, committees solicit information from a narrow set of experts (Baumgartner and Jones 2015). In most instances, though, where problems are highly dimensional and information is abundant, congressional committees will engage

in information prioritization. That is, a committee looks to a broad range of information suppliers and decides who to attend and who to ignore. This chapter is focused on the second information gathering strategy: information prioritization.

Information prioritization is an information gather strategy employed by congressional committees when problems are multidimensional and information is abundant. This information gathering strategy is consistent with the pluralistic information processing framework discussed in the previous chapters. Subsystem actors compete to supply information to Congress and committees prioritize information from a broad range of sources.

Information Advantage of Bureaucrats

Bureaucrats have a unique advantage in the information supply process, which makes them more likely to be prioritized when Congress is most uncertain about the policy problem. In the face of high problem uncertainty (the inability to define a problem or identify its most important dimension), Congress needs accurate, reliable, and stable information to help define the issue at hand.

Bureaucrats are often considered the most accurate source of information because their information collection is directed by law (see Carlson 2011; Workman 2015). While there is still a distinct possibility of bureaucrats supplying biased information (especially for expanded budgets (see King 1997; Dery 1984), these biases are much more easily accounted for than biases from private groups given the repeated interactions between Congress and the administration. Bureaucrats, especially careerists, have repeated interactions over the course of their careers with members of congressional committees and the committees' staffs. These long term relationships and the relative lack of competition among bureaucracies also allow bureaucrats to

establish reputation as reliable (predictable) and stable sources of information and expertise.

Bureaucrats' lack of competition relative to their private counterparts also increases the likelihood that an agency may hold an information monopoly. For instance, there is only one agency capable of regulating domestic nuclear energy, the Nuclear Regulatory Commission (www.nrc.gov). In the private sector, on the other hand, many companies and interest groups compete in a given industry or policy domain. As a result of low competition for agencies, it is more likely that bureaucrats hold an information monopoly in a given policy area. In highly regulated policy areas, such nuclear energy and bioterrorism, private companies and groups have little access to information. In other areas, like banking, bureaucracies are only one of many types of institutions with policy-relevant information.

This chapter sets out to investigate the information advantage of bureaucrats. Specifically, are bureaucrats more likely to testify when congressional committees are uncertain about the problem? Across all policy areas, congressional committees are expected to invite more bureaucrats to testify at hearings as the problem uncertainty increases. As a committees becomes more uncertain about which problem is important or which dimension of a problem is most important, bureaucrats should become more prevalent at hearings. This trend should be especially true for careerist bureaucrats, those bureaucrats hired on merit, who have spent years working in specific policy area, garnering extensive policy-specific expertise and knowledge. In policy areas where bureaucrats are more likely to hold information monopolies are they more likely to testify at congressional hearings? As mentioned in the previous chapter, bureaucrats are expected to testify more in health and energy policy areas because those are the issues in

which we are most likely to see agencies with information monopolies. The NRC in energy policy and the Centers for Disease Control and Prevention in health policy.

RESEARCH AND FINDINGS

Many times bureaucracies are created for the purpose of information gathering. The U.S. Census, the U.S. of Labor Statistics, and the Energy Information Administration are all great examples of agencies created to supply information to Congress and the president. The above sections have argued that bureaucrats have an information advantage not just because Congress has created them for that purpose, but also because of repeated interactions between the two institutions, the long-term stability of federal agencies, and the relative lack of competition among bureaucracies. The rest of this chapter is devoted to empirically exploring the information advantage of bureaucrats by outlining the data collection and coding processes, reviewing the research design, and then presenting and discussing the findings.

Hearings Data

To explore the idea of a bureaucratic information advantage, 4,745 congressional committee hearings on domestic commerce, energy, and health care policy areas were collected using the Policy Agendas Project's Congressional Hearings Dataset.[29] Using this set of hearings, all 33,090 witnesses testifying at these hearings were collected and coded according to the institution with which they are affiliated: public institution, government entity, business, or interest group. Government witnesses were additionally coded as to whether they represent a sub-national government or federal bureaucracy or if they are a member of Congress.

[29] Policyagendas.org

The analysis presented in this chapter is interested in bureaucrats[30] testifying at hearings in these policy areas. The analysis here explores not only whether or not bureaucrats have an information advantage when Congress faces problem uncertainty, but also if there is a difference between careerists and appointees as information suppliers. The *Plum Books*[31] from 1992-2008 were used to identify which witness are careerists and which are presidential appointees. Those bureaucrats that are listed as presidentially appointed by the *Plum Book* as well as those that served on White House advisory boards were coded as appointed. Bureaucrats with a career appointment listed in the *Plum Book* or with a position not listed in the *Plum Book* were coded as careerists.[32]

[30] Witnesses coded as bureaucrats were broadly defined to included not only those representing federal administrative agencies, but also those represented federally sponsored institutions like national laboratories, White House Task Forces, congressional agencies, and federal judges. While obviously not all of these groups are traditionally defined as bureaucrats (especially, federal judges), they fit most closely within this witness category.

[31] *United States Government Policy and Supporting Positions (Plum Book)*, 1992-2008 published by the U.S. Government Publishing Office. http://www.gpo.gov/fdsys/pkg/GPO-PLUMBOOK-2012/content-detail.html

[32] The "Other" category contains those witnesses who had temporary or former appointments to bureaucracies, work for congressional agencies (ex. Congressional Budget Office), federal judges, and institutions with congressional charters (ex. national labs, task forces, veterans' groups).

Table 9: Types of Bureaucrats Testifying by Policy Area, 1995-2010

Policy Area	Bureaucrats Testifying
Domestic Commerce	
Careerists	1456
Presidential Appointees	1355
Other	347
Total	3158
Energy	
Careerists	834
Presidential Appointees	612
Other	132
Total	1578
Health Care	
Careerists	2437
Presidential Appointees	813
Other	361
Total	3611
	8347

Table 9 shows the types of bureaucrats testifying by policy area from 1995 to 2010. In both the domestic commerce and energy policy areas, presidential appointees and careerists are fairly equally represented as information suppliers at congressional hearings. In health care, though, careerists account for over three times as many witness appearances as presidential appointees. In all three policy areas, "Other" bureaucrats make up a fraction of witnesses testifying at committee hearings.

There are three independent variables of interest: policy area, committee type, and problem uncertainty. Policy area is determined according to the Policy Agendas Project's content coding scheme. The scheme is consistent over time and across institutions. The three policy areas chosen, domestic commerce, energy, and health

care, allow for great variation in not only the participates (committees and witnesses), but also issue context.

As mentioned previously, different policy areas have different prevailing weights for prioritizing the dimensions of a problem. Energy policy is characterized by high dimensionality, with members of Congress weighting problem dimensions on the basis of regional, constituency, and ideological concerns (see Jochim and Jones 2013). Health care policy, though, is considered to have low dimensionality given its tendency to be weighted on the basis of ideology alone. Domestic commerce policy falls somewhere between the two (see Jochim and Jones 2013). Also, due to some policy areas being highly regulated, such as nuclear energy production, bureaucrats have a natural information monopoly.

Congressional committees seem to invite bureaucrats at equal rates across the three policy areas according to Table 10. From 1995-2010, 3,158 bureaucrats testified in domestic commerce policy, roughly 27.9 percent of all witnesses testifying in that policy area. In energy and health care policy areas, bureaucrats made up 27.4 and 28.1 percent of all witnesses testifying, respectively, during the same time frame. This table suggests that congressional committees prioritize bureaucrats equally across policy areas.

Table 10: The Number of Bureaucrats Testifying by Policy Area, 1995-2010

Policy Area	**Bureaucrats Testifying**	**Percent of Total Witnesses**
Domestic Commerce	3158	27.9
Energy	1578	27.4
Health Care	3611	28.1

Congressional committees are the second independent variable of note. Applying the framework laid out by Fenno (1973) and Deering and Smith (1997), the committers were coded based on their overarching goals. A member of Congress requests a committee assignment that will facilitate his or her priorities: reelection through committee service, making good public policy, or gaining power and prestige. Because all members choose a given committee for a similar reason, each committee will have an overarching goal. That goal will influence how the committee prioritizes information. A committee focused on power will prioritize powerful sources of information: fellow members of Congress and high ranking (usually presidentially appointed) bureaucrats. The following table shows the total number of bureaucrats testifying by committee type form 1995-2010. According to Table 11, 27.0 percent of all witnesses invited to testify by constituency committees are federal bureaucrats. This numbers is higher than those for both policy and power committees.

Table 11: The Number of Bureaucrats Testifying by Committee Type from 1995 to 2010

Committee Type	Bureaucrats Testifying	Percent of Total Witnesses
Constituency	3428	27.0
Policy	3531	24.1
Power	1388	24.3

Figure 4 shows bureaucrats testifying as a percent of all witnesses in each policy area by committee type from 1995-2010. The rates at which bureaucrats are invited in these three policy areas, domestic commerce, energy, and health care, seem to be less distinguishable by committee type than expected. In domestic commerce policy, bureaucrats account for approximately 10 to 35 percent of all witnesses testifying at

hearings held by power committees. This is not in accordance with expectations of power committees' information preferences for federal bureaucrats. Constituency committees, in domestic commerce policy invite a similar percentage of bureaucrats. Between 10 and 20 percent of all witnesses testifying before constituency committees are federal bureaucrats. This does reflect the expected information preferences of constituency committees, which should prefer constituency and clientele groups over other witness types. In domestic commerce policy, between 25 and 40 percent of all witnesses testifying at policy committee hearings are bureaucrats. This percentage is probably higher than expected given policy committees' preferences for partisan groups.

In energy, bureaucrats only account for roughly 20 to 50 percent of witnesses in policy and constituency committees. Lower percentages of bureaucrats testifying supports expectations that policy and constituency committees prioritize partisan and clientele groups, respectively, more so than bureaucrats. Power committees in energy policy do not always prioritize bureaucrats at high rates, but there are major spikes in 1995, 1998, and 2010. (There are no energy hearings in 1996, 2002, 2003, and 2009.)

In health care policy, bureaucrats are prioritized at the lowest rates by these three committee types. It is especially interesting to note that power committees prioritize fewer bureaucrats relative to the total witnesses over time, with fewer than 15 percent of witnesses being bureaucrats in 2009 and 2010. Constituency and policy committees both prioritize bureaucrats at fairly low rates with less than 45 percent for constituency committees and less than 30 percent for policy committees.

The final independent variable of interest is problem uncertainty. Problem uncertainty is a measure of how sure a congressional committee is of the problem definition (See Figure 3 in Chapter Three). Committees with high uncertainty are looking across multiple issue areas to determine the problem or its most important

attributes. Committees with low uncertainty are focused on a single, specific policy area. Committees need accurate, reliable, and stable sources of information to cope with problem uncertainty and, therefore, invite more federal bureaucrats (especially careerists) to testify. Problem uncertainty is calculated as the inverse of the Herfindahl-Hirschman Index using all hearings held from 1995-2010. (Please see the discussion in Appendix D for how it was calculated.)

Figure 5 shows the average problem uncertainty in each policy area by committee over this time frame. The uncertainty is measured as one being complete uncertainty and zero being complete certainty. The figure shows clear differences between bureaucrats testifying at committee hearings both across policy and committee type. The average problem uncertainty at a hearing in each policy area by committee from 1995-2010. In domestic commerce policy, power committees have the highest levels of uncertainty; whereas constituency committees have the lowest. Other than the mid-1990s for constituency committees, the average level of uncertainty per hearing is fairly consistent.

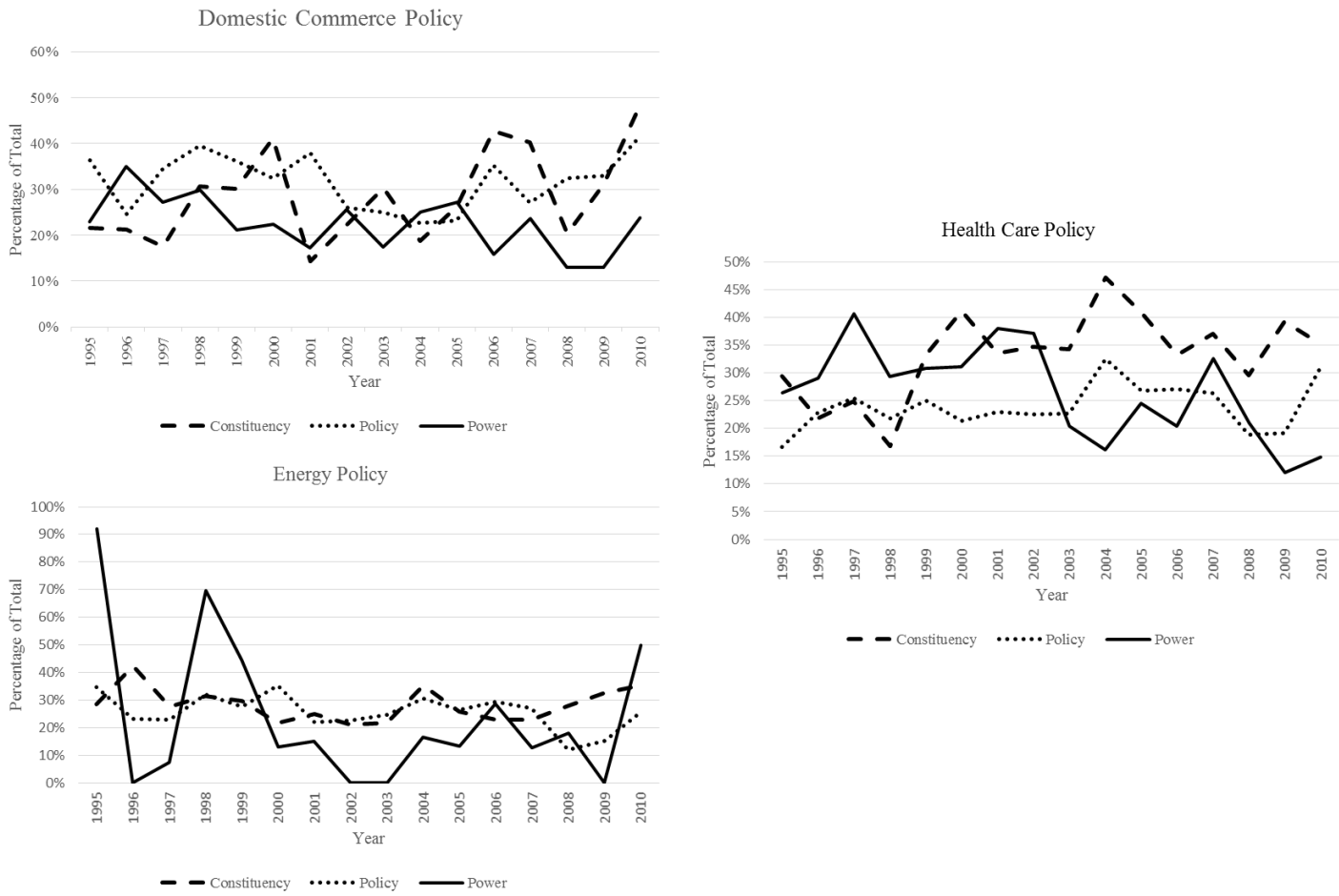

Figure 4: Bureaucrats as a Percent of Total Witnesses Testifying in Domestic Commerce, Energy and Health Care by Committee Type, 1995-2010

In energy policy, power committees' uncertainty seems to go down over time, with uncertainty measuring at 0.8 in 1995 and about 0.6 in 2010. Constituency committees' uncertainty remains stable at about 0.6 over this time, but policy committees' uncertainty decreases overtime. Uncertainty in health care policy fairly stable during this time frame. There is an uptick in uncertainty in this policy area in 2009 and 2010 for both policy and power committees. This uncertainty could be due to health care reform and committees struggling to define and structure the health care policy debates.

Figure 5 shows that overall averages of uncertainty are fairly stable by committee types across policy areas from one year to the next. Further analysis is necessary to determine how month to month changes in uncertainty can affect committees' information preferences. There is some evidence in Figures 4 and 5 that this may be the case. In health care, for example, there are upticks in uncertainty in 2009 and 2010 in Figure 5 and increases in the percentage of bureaucrats testifying in 2009 and 2010.

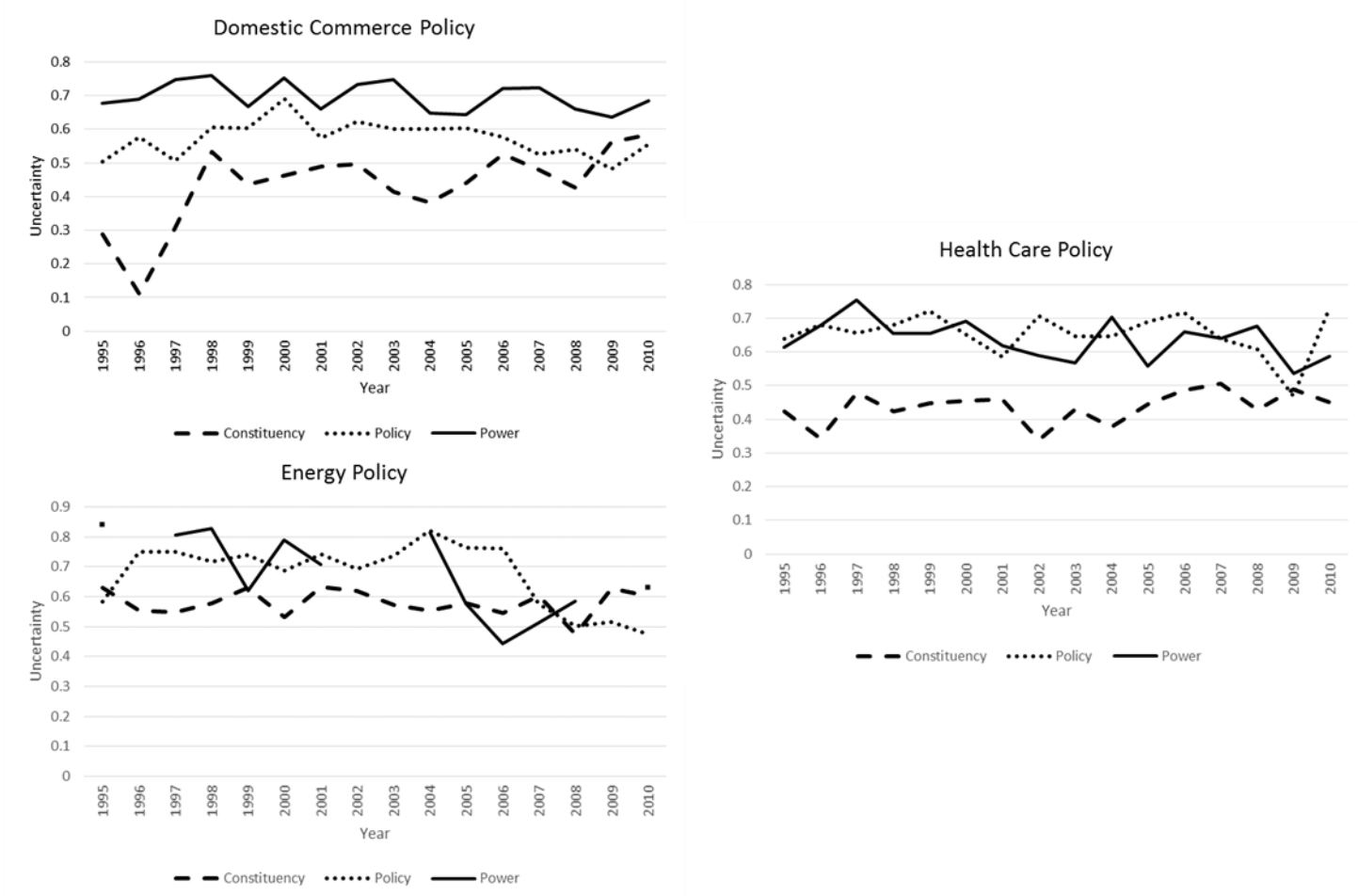

Figure 5: Problem Uncertainty in Domestic Commerce, Energy, and Health Care Congressional Hearings by Committee Type, 1995-2010

In addition to these three key independent variables, several control variables were collected including those to gage hearing type, party, and chamber. A fixed-effects variable was added to control for changes over time. Variables for congressional chamber (62.6 percent of hearings were held by the House), majority party of chamber (Republican majorities account for 65.5 percent of hearings), and unified government (46.1 percent of hearings were held during unified government) control for differences in chamber, party, and political environment. Lame duck presidential status, coded as the last two years of a president's second term was also accounted for and represents 31 percent of hearings. Differences in hearing types: appropriations versus non-appropriations and referral versus oversight were also identified. Appropriations hearings account for 0.04 percent of hearings; whereas, referral account for 16 percent of hearings. Last the total number of non-bureaucrat witnesses were noted in order to ensure that more bureaucrats were not testifying simply because committees were inviting more witnesses generally.

Findings

Using the data described above, negative binomial regression was employed to model the relationship between bureaucrats testifying and the policy area, committee preferences, and problem uncertainty. Negative binomial models are appropriate for this study given the dependent variable is a count of bureaucrats testifying at a given hearing. This model controls for the overdispersed nature of the data that a simpler count model (i.e. Poisson) could not. The first model gages the differences in bureaucrats testifying across policy area, committee type, and uncertainty.

To refresh, based on the theory of pluralistic information supply and this new approach to information prioritization presented previously, we should expect to see the following:

> 1: The number of federal bureaucrats invited to testify at congressional committee hearings varies by both policy area reflecting the likelihood of bureaucrats having information monopolies.
> 1a: Bureaucrats are less likely to testify at hearings on domestic commerce than at hearings on energy or health care.
> 2: Power committees invite more bureaucrats to testify relative to the other committee types because bureaucrats hold information most likely to help committees achieve their goals and complete their oversight tasks.
> 3: All committees with problem uncertainty prioritize bureaucrats as sources of information.

Figure 6 shows the findings for the first negative binomial model which estimates the number of bureaucrats[33] testifying at committee hearings. (Full regression results are presented in Table E1 in Appendix E). The dots on the coefficient plot represent the point estimates of the coefficients; whereas, the lines represent 95 percent confidence intervals for each estimate. If the confidence interval does not cross the vertical line at zero, the coefficient is statistically significant. The baseline policy area and committee type is business regulation and constituency committees, respectively. Overall, these results show that the number of bureaucrats testifying at congressional committee hearings varies by policy area, committee type, and in regards to problem uncertainty.

[33] All witnesses coded as bureaucrat, including the "other" category.

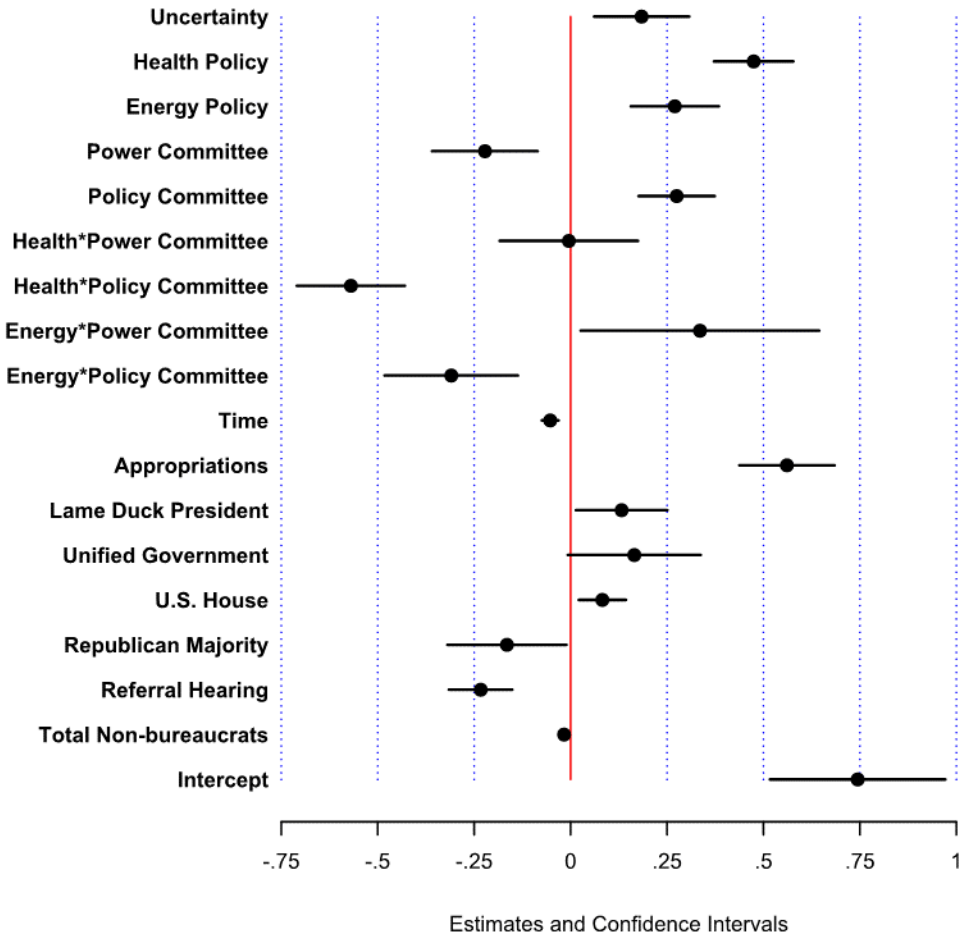

Figure 6: Negative Binomial Model: The Number of Federal Bureaucrats Testifying at a Committee Hearing, 1995-2010

First, there are clear differences across policy areas in terms of how many bureaucrats are invited to testify at a given hearing. Specifically, bureaucrats are least likely to testify in domestic commerce policy, most likely due to the fact that bureaucracies in this policy area are less likely to hold information unavailable to other types of information suppliers. In health care and energy policy areas, more bureaucracies are likely to testify at committees hearings. In these policy areas,

bureaucrats are much more likely to hold information that is unavailable to private businesses or interest groups. Nuclear energy and bioterrorism are two great examples of where private institutions and organizations are much less likely to have the information necessary for policy making.

Second, there are also clear differences in the number of bureaucrats testifying at a congressional committee hearing across committee types: constituency, policy, and power committees. When interacting policy area and committee type, it appears that committees vary how they prioritize information by policy area. Power committees in domestic commerce policy invite the least number of bureaucrats to testify. This finding is counter to expectations that power committees would favor bureaucrats given their interest in bureaucratic oversight as well as prioritizing key policy players (i.e. department secretaries). Policy committees in domestic commerce invite the most bureaucrats to testify at a given committee hearing. Policy committees are expected to favor partisan sources of information, so it is not totally unexpected that they would prioritize bureaucrats as sources of information, especially presidentially appointed bureaucrats. Presidentially appointed bureaucrats provide partisan cues in addition to their policy-related testimony.

On the topic of health care policy, policy committees invite less bureaucrats to testify than the other two committee types. The findings for health care do not really align with the prior expectations of how committees prioritize information. Policy committees are most likely to prioritize partisan sources of information, which would mean less space for bureaucrats, especially careerists. However, power committees and constituency committee prioritize bureaucrats roughly the same rates. This finding is consistent with expectations that policy committees would prioritize bureaucrats the most, given their task of overseeing the administrative agencies.

The findings for energy policy most closely follow the prior expectations for committee's information preferences. On the topic of energy, policy committees invite the least bureaucrats to testify which makes sense given their tendency to prioritize partisan sources of information. Power committees, though, invite the most bureaucrats to testify, which, again, is reflective of the fact that they are concerned with bureaucratic oversight.

Third, as problem uncertainty increases so too does the number of bureaucrats invited to testify at a congressional committee hearing, regardless of both policy area and committee type. This finding supports the idea of bureaucrats having an information advantage, especially when committees are struggling to define problems. Bureaucrats have long standing relationships with committees, with repeated interactions, and lack the competition that private institutions face in the market. These characteristics encourage congressional committees to rely on bureaucrats more heavily for information, especially during times of uncertainty.

To assure that more bureaucrats are invited to testify during times of problem uncertainty and not just more witnesses generally, the model controls for the total number of non-bureaucrats testifying at each hearing. While the total number of non-bureaucrats testifying does have a statistically significant effect on the number of bureaucrats testifying at a congressional hearing, the magnitude is tiny. Congressional committees are not just inviting more witnesses when they are faced with problem uncertainty. Committees are, in fact, targeting federal bureaucrats.

The model also controls for several factors, such as time, hearing type, and party variables. In terms of time, the findings suggest that over years the number bureaucrats invited to testify decreases. This is congruent with recent work that suggests politics are becoming more and more structured by partisan frameworks (see Theriault 2013). As

Theriault (2013) points out in his study of the Senate, Congress has become more polarized over time, with many policy decisions driven by ideology. As policy making is increasingly structured by partisan frameworks, it becomes more likely that committees will focus on partisan sources rather than policy sources of information (see Rich 2004).

The number of bureaucrats testifying also varies by hearing type. Appropriations hearings, which focus on funding the federal bureaucracy, have more bureaucrats testify at them than other hearings types. Referral hearings on legislation, on the other hand, have fewer bureaucrats as witnesses than other hearing types. Intuitively, both of these findings are expected. Appropriations hearings will naturally require lots of bureaucratic expertise, as will non-legislative hearings (oversight hearings). Both of these hearings focus specifically on the federal bureaucracy. Referral hearings, though, focus on legislation and require less bureaucracy-specific expertise.

In terms of the relationship between party and the number of bureaucrats testifying, it appears that Republicans invite fewer bureaucrats to testify than Democrats. Democrats are often thought of as being in favor of expanding the size and role of the federal bureaucracy so this finding is not unexpected. Also, during lame duck sessions of the president, more bureaucrats are invited to testify. This finding most likely reflects increased oversight of the bureaucracy leading up to elections, such as the Benghazi hearings and the investigations of Hillary Clinton.

The last interesting finding is that the House, in general, invites more bureaucrats to testify than does the Senate. The House has less resources for its members in terms of staff, but also House members are limited by two year terms and lengthy reelection campaigns. These factors leave little time and resources to allow House members to become policy experts on the same level as their Senate counterparts. The House's

greater reliance on bureaucrats' expertise may be one way House members make up for their time and resource deficiency.

Since the findings of negative binomial models cannot be directly interpreted, the predicted probabilities for the most important variables: policy area, committee type, and problem uncertainty are show in Figures 7 and 8. Figure 7 shows the predicted probability for the number of bureaucrats testifying at committee hearings given policy area and changes in problem uncertainty. The three policy areas are represented by the three lines with bands representing their 95 percent confidence intervals. Keep in mind while reading the graphic, an average number of only seven witnesses testify at a given hearing so two bureaucrats testifying represents 28.6 percent of the witness panel.

As uncertainty increases from zero (total certainty) to one (total uncertainty), the number of bureaucrats invited to testify in each policy are increases at roughly the same rate. As expected, fewer bureaucrats testify in domestic commerce policy than in energy and health care policy areas.

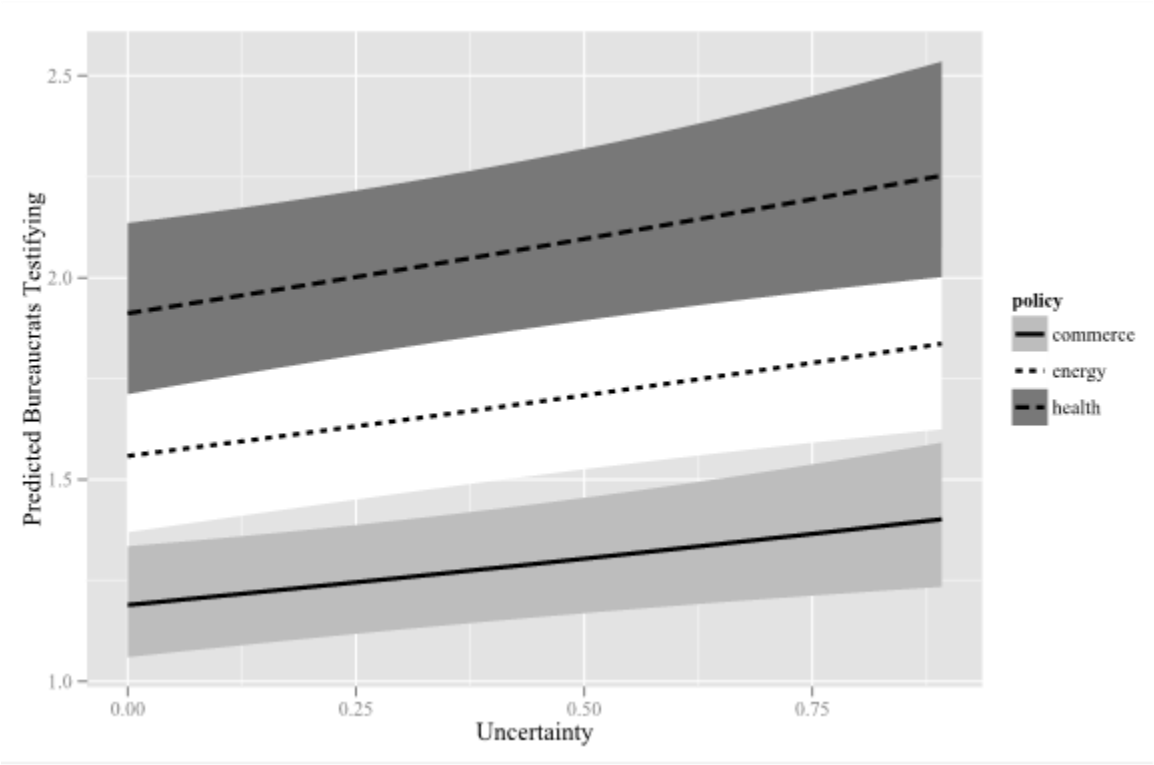

Figure 7: Predicted Number of Bureaucrats Testifying at Domestic Commerce, Energy, and Health Congressional Committee Hearings as Uncertainty Increases

Figure 8 shows the predicted number of bureaucrats testifying at hearings by constituency, policy, and power committees and changes in problem uncertainty. The baseline policy used here, again, is domestic commerce policy. As the above figure shows, the fewest bureaucrats testify in this policy area. All three committees invite more bureaucrats to testify as problem uncertainty increases. Policy committees are predicted to invite the most bureaucrats to testify at hearings, which again is not completely unexpected. Presidentially appointed bureaucrats can provide the partisan information that policy committees tend to prefer. It is unexpected that power committees are predicted to invite so few bureaucrats.

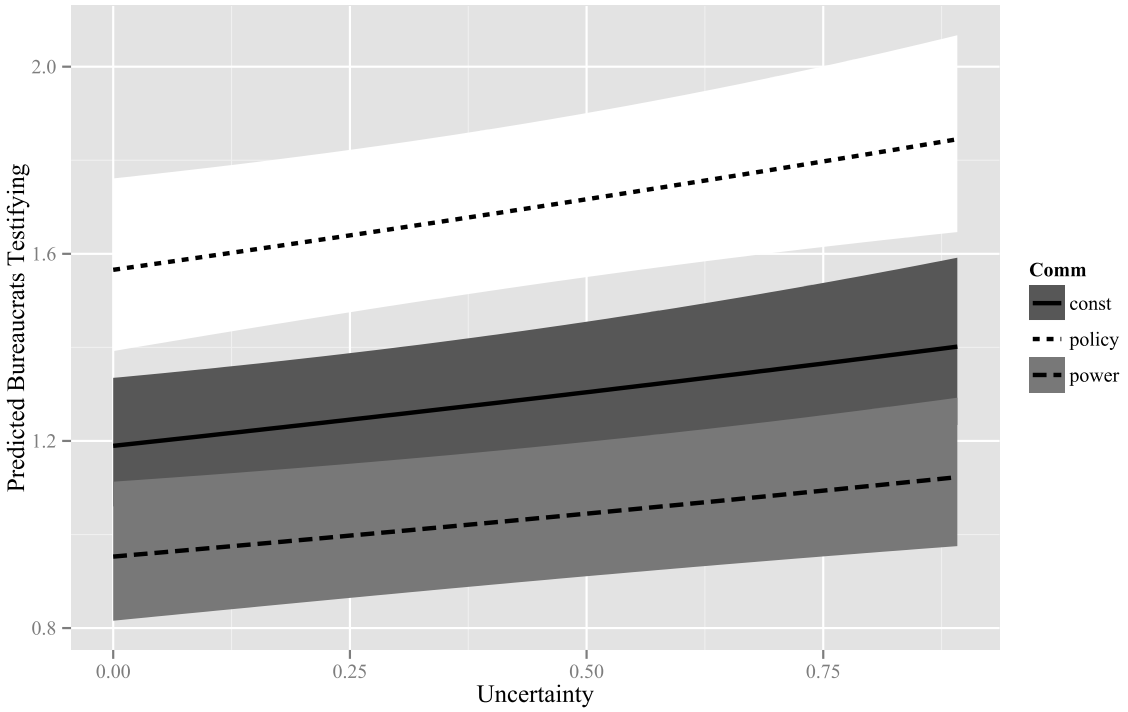

Figure 8: Predicted Number of Bureaucrats Testifying at Constituency, Policy, and Power Committees as Uncertainty Increases, 1995-2010

Many of the findings presented so far supports the idea of an information advantage of federal bureaucrats, especially in terms of problem uncertainty. Careerist bureaucrats, though, should have a greater information advantage than their presidentially appointed counterparts given their longer tenures with the agencies as well as their professional training and expertise. Because of the differences between these two types of federal bureaucrats, the model was rerun predicting the number of *careerist* bureaucrats testifying across policy areas, committee types, and in response to problem uncertainty. Below are the expectations expressed previously:

> 3a: Careerist bureaucrats are more preferred than their presidentially appointed counterparts during times of uncertainty because of greater

levels of expertise and longer relationships with congressional committees.

Figure 9 displays the findings for the negative binomial model predicting the number of careerist bureaucrats[34] testifying at a given committee hearing. (Full regression results are presented in Table E1 in Appendix E). The dots on the coefficient plot are interpreted exactly as before with the coefficients represented by the dots and the 95 percent confidence intervals represented by the lines. If the confidence intervals do not cross the vertical line at zero, the coefficients are statistically significant. The baseline for policy area and committee type is, again, business regulation and constituency committees, respectively. Again, these findings show that the number of careerist bureaucrats testifying at congressional committee hearings varies by policy area, committee type, and in regards to problem uncertainty.

[34] Only those bureaucrats with either career appointments or merit based positions. This does not included any of the presidentially appointed bureaucrats or any that fall into the "other" category.

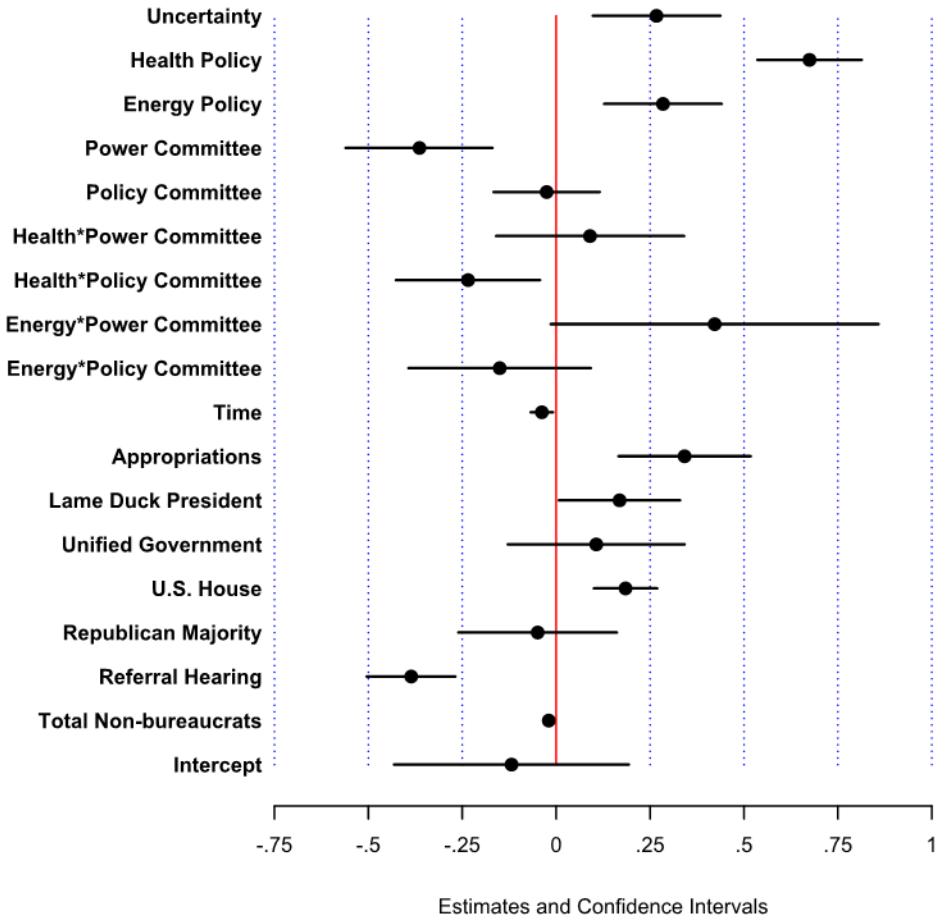

Figure 9: Negative Binomial Model: The Number of Careerist Bureaucrats Testifying at a Committee Hearing

Uncertainty remains positively and significantly associated with the number of bureaucrats testifying at a committee hearing. In fact the magnitude of the coefficient even appears to increase in this model. It appears that when committees are experiencing problem uncertainty that they invite more bureaucrats to testify, especially careerist bureaucrats. Careerist bureaucrats tend to have longer relationships with the congressional committees given their much longer tenures. Careerists' often work for the same agency for decades; whereas, presidentially appointed bureaucrats often serve

for only four to eight years. Further, careerist bureaucrats were hired based on their professional training. Presidentially appointed bureaucrats may or may not be experts in the policy field in which they work. Michael D. Brown, the director of the Federal Emergency Management Agency during the Hurricane Katrina crisis, is an excellent example of a presidentially appointed bureaucrat who was not well-qualified for his position. These key differences between careerists and presidentially appointed bureaucrats appear to amplify the information advantages of the careerist bureaucrats.

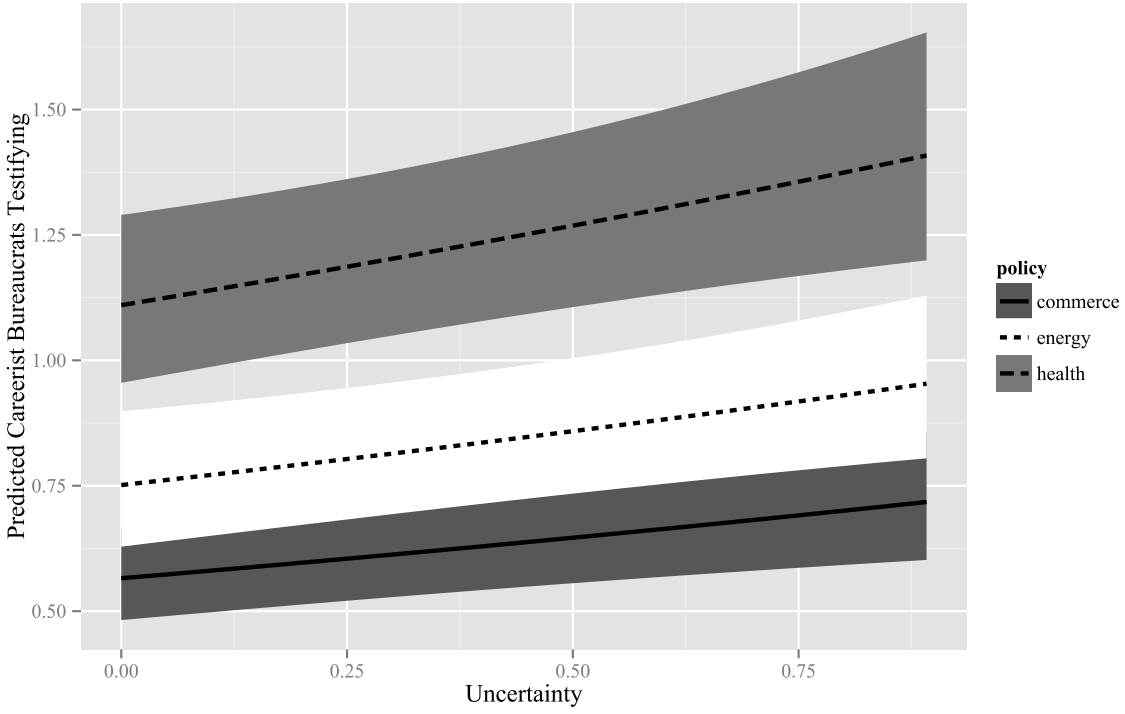

Figure 10: Predicted Number of Careerist Bureaucrats Testifying at Domestic, Energy, and Health Congressional Committee Hearings as Uncertainty Increases

Again, as the findings of negative binomial models cannot be directly interpreted, the predicted probabilities for committee type and problem uncertainty are show in Figure 10. Figure 10 displays the predicted probability for the number of

careerist bureaucrats testifying at committee hearings in each policy area given changes in problem uncertainty. The three policy areas are represented by the three lines with bands representing their 95 percent confidence intervals. Keep in mind while reading the graphic, an average number of only seven witnesses testify at a given hearing so one careerist bureaucrat testifying represents roughly fourteen percent of the witness panel.

As uncertainty increases from zero (total certainty) to one (total uncertainty), the number of careerist bureaucrats invited to testify in each energy and commerce increases at roughly the same rate. Overall, more careerist bureaucrats testify in health care policy than in energy and domestic commerce policy areas. It seems that as uncertainty increases in health care policy, the number of careerist bureaucrats testifying increases at sharper rate. At the highest level of uncertainty, roughly twenty percent of a hearing panel on health care policy is comprised of careerist bureaucrats.

There are three other important differences between the two models. First, in domestic commerce policy, the policy committees do not invite more careerist bureaucrats compared to the other committees. This finding suggests that the increased number of bureaucrats testifying at policy committee hearings from the previous model were a result of policy committees attending to presidentially appointed bureaucrats at higher rates. Policy committees prefer information from partisan sources. Presidentially appointed bureaucrats can not only provide expert information, but also partisan cues.

Second, in energy policy, power committees do not invite more careerist bureaucrats than other committees, which is counter to the finding in the previous model. This suggests that the previous finding, power committees in energy invite more bureaucrats to testify than other committees, was driven by presidentially appointed bureaucrats. Since much of what power committees do is oversee the federal

bureaucracy, extra attention to those bureaucrats in charge of running the agencies is expected.

Third, the model, again, suggests that the House of Representatives, in general, invites more careerist bureaucrats than the Senate. In fact, when comparing this finding to that in the previous model, the magnitude of the coefficient is increased for careerist bureaucrats. This finding suggests that House members rely more heavily on bureaucrats for policy expertise, especially careerist bureaucrats. This finding provides more support for the theory of an information supply for bureaucrats, especially careerists, who should have an extra advantage given their professional training and longer tenures with their agencies.

Conclusions

The findings presented in this chapter suggest that the number of bureaucrats invited to testify at congressional committee hearings by policy area, committee type, and in response to problem uncertainty. Bureaucrats are least likely to testify in domestic commerce, a policy area in which it is unlikely for a federal agency to have information that is unavailable to other information sources.

Further, depending on the policy area, committees adjust how they search for information. In domestic commerce policy, for example, policy committees invite higher numbers of bureaucrats than other committee types. It appears that these policy committees are inviting high numbers of presidentially appointed bureaucrats, who are capable of supplying both technical expertise and partisan cues. Policy committees in energy and health care, though, invite the fewest number of bureaucrats in these areas. This finding is also true for other committee types. The rate at which committee types invite bureaucrats to testify varies by policy area.

The most interesting findings presented chapter are those supporting the notion of bureaucrats having an information advantage. First, as a committee's uncertainty about a problem increases, in invites more bureaucrats to testify. This finding is magnified for careerist bureaucrats who have longer tenures with their agencies, longer standing relationships with Congress, and have received professional training in their particular fields. Bureaucrats are also more likely to testify before the House, suggesting that members of the House rely on bureaucrats, especially careerist bureaucrats, to make up for less resources, time, and policy expertise relative to the Senate.

This chapter focuses on the information advantage of bureaucrats, which the findings presented herein suggest exists. However, the work by May (1991) on policies with public and those without publics suggests that other groups, both private and public institutions, can experience advantages, depending on the specific policy area. The following two chapters investigate when different witness types are most likely to be prioritized in the various subsystems within energy policy.

Chapter 5: Prioritizing Private Sources of Information in Energy Policy

One of the underlying assumptions of the pluralistic theory of information processing is that subsystem actors compete to supply information to Congress. The subsystem actors, federal bureaucrats, interest groups, state and local governments, and businesses, want to supply information to help define problems and structure policy debates. How a problem is defined structures how that policy area is discussed and which solutions are deemed viable.

The subsystem actors are all motivated to define problems to shape the policy process to favor their preferences. However, the underlying motivations differ by actor. Bureaucrats, for example, are often created for the sole purpose of gathering information for Congress. In addition, gaining control of a policy area via problem redefinition can mean expanded budgets or jurisdictions (see King 1997 and Dery 1984). In other instances, providing information may allow bureaucrats to protect their status quo jurisdictions (May, Sapotichne, and Workman 2009).

The previous chapter showed evidence of bureaucrats, especially careerist bureaucrats, having an inherent information advantage. In fact, as the problem uncertainty for a committee increases, so too does the number of bureaucrats testifying, especially careerists. The bureaucrats' information advantage appears to exist in all three policy areas. Within these three areas, bureaucrats have the greatest advantage in health than the other policy areas. Depending on the policy area, though, committees vary in how much they prioritize bureaucrats. In energy policy, for example, policy committees are most likely to invite bureaucrats to testify.

May (1991) argues that different subsystems will have different types of active coalitions. For instance, policies with publics, such as gas and oil extraction, should

have diverse and active subsystems (May 1991). Based on the pluralistic theory of information the actors within these subsystems are actively competing to supply information to Congress. Policies without publics, which usually deal with technical issues or "public" risks (ex. nuclear energy), will have very limited coalitions that are usually limited to scientific experts.

Only those available sources of information can be prioritized by committees. The available sources of information is partially based on whether the policies are with or without publics. For policies with publics, diverse subsystem actors compete to supply information to Congress. In these policies, there is a wider range of actors garnering attention than in policies without publics. In those policy areas without publics, though, there are few actors capable of supplying information other than technical and policy experts, which will naturally be favored by congressional committees to supply information.

This chapter and the one that follows will investigate when each type of witness is likely to have an information advantage or be Congress's preferred source of information. This chapter looks specifically at private witness types, businesses and interest groups, paying particular attention to businesses. In the sections that follow, the motivations of actors to supply information, the information preferences of committees, and the characteristics of specific energy topics are discussed. Final sections will investigate when businesses and interest groups are most likely to testify by committee type, energy topic, and problem uncertainty. In short this chapter seeks to answer the following question: In which scenarios are private witnesses, businesses and interest groups, most likely to be prioritized as information suppliers?

INFORMATION PROCESSING IN ENERGY POLICY

Within each subsystem, actors are motivated to share information with Congress to try to influence problem definitions, structure policy debates, and influence policy making. The competition to supply information, either from a large, diverse set of actors in policies with public or from a more limited group of experts in policies without publics, requires Congress to sort through the available information and determine which sources should receive information and which should not. Congress has two information gathering strategies, one of which, information prioritization, is best for dealing an abundance of available information. Information prioritization requires that Congress choose from available sources who will be prioritized and receive congressional attention and who will not.

Within energy policy, the nature of the policy determines which sources of information are most active within a subsystem and, therefore, which sources Congress can prioritize. In policies with publics, Congress will have a greater variety of information sources from which to choose. In policies without publics, though, bureaucrats and other technical experts are likely to dominate the information supply process.

The goals of each committee (constituency service, making public policy, and gaining power within the chamber) determine which sources of information (e.g. bureaucrats, interest groups, business representatives) are most likely to receive attention. In policies with publics these goals are going to be even more important in determining who testifies given the large, diverse set of actors competing to supply information. In policies without publics, bureaucrats and other experts are most likely to testify given they are the actors most likely to have the information necessary for policy making.

The following two sections will outline the information supply and information prioritization in energy. First, the differences in specific issue areas within energy policy will be discussed, paying particular attention to the distinctions between policies with and without publics. Second, the motivations of private sources of information—businesses and interest groups—will be identified. The second section, on the prioritization of information in energy, discusses the impact of committees' goals on the information prioritization process.

Private Sources of Information in Energy

The previous chapter was solely focused on bureaucrats as information suppliers. This chapter, and the analysis presented herein, is interested in when private sources of information—businesses and interest groups—are likely to have an information advantage in specific energy policies. Businesses and interest groups compete to supply information to Congress to define problems, structure policy debates, and, ultimately, influence the direction of policy making. Businesses and interest groups, though, vary by their specific motivations, the policy areas in which they are most likely to be active, and the committees by which they are most likely to be prioritized.

Interest groups and businesses want to influence public policy towards their policy preferences. A very effective way to influence policy making for these groups is by supplying information by lobbying and testifying at congressional committee hearings (Kingdon 1984; Smith 1995; Nownes 2001). In fact, committee hearings often reflect the information committee members gain privately via lobbyists, broadcasting that private information to the lager policy-making community (see Leyden 1995; Wright 1996; Burstein and Hirsh 2007; Gromley 1998).

The prominence of interest groups and businesses testifying in energy issue areas varies. In those policy areas where there are economic, private risks linked to policy making, such as electricity, coal, and gas, businesses and interest groups (especially trade and professional associations) are most active in the competition to supply information. Not only are businesses and interest groups more active, but they clearly have pertinent information on these policy areas given that they operate within these industries and are directly affected by policy changes.

Table 12: Congressional Committee Hearings and Witnesses by Issues and Publics in Energy Policy, 1995-2010

Energy Subtopics	Public	Number of Hearings	Average Number of Businesses per Hearing	Average Number of IG per Hearing
General	Yes	132	1.18	1.22
Nuclear Energy and Nuclear Regulatory Commission Issues	No	75	0.85	1.01
Electricity and Hydroelectricity	Yes	112	3.72	1.92
Natural Gas and Oil	Yes	235	2.03	1.77
Coal	Yes	20	2.5	1.65
Alternative and Renewable Energy	Yes	111	2.31	1.87
Energy Conservation	Yes	59	1.83	2.25
Research and Development	No	64	1.05	0.47
Other	No	18	1.5	0.83
Overall		**826**	**1.96**	**1.56**

In those policy areas with public risks that are not directly linked to private, economic risks, businesses and professional and trade associations are least likely to be active in the information supply process, and, therefore, less likely to be invited to testify at congressional committee hearings. Table 12 shows the specific issues within energy policy[35] and those that are considered having policies with publics and those without publics.

In the policy areas where these private sources of information, businesses and interest groups, are most likely to supply information they are more likely to be prioritized by congressional committees to testify. Witnesses representing businesses testify in higher numbers at energy hearings on electricity, alternative and renewable energy, and natural gas and oil. Interest groups testify in higher numbers at committee hearings on energy conservation, electricity, and alternative and renewable energy. These issue areas are all policy areas with active publics, supporting the idea that these groups are most active and, therefore, most likely to testify in these areas.

The fewest number of businesses and interest groups testify at energy hearings on nuclear energy, research and development, general and "other" issue areas. All of these issue areas are considered coded as policies without publics, with the exception of general energy policy. Fewer numbers of private businesses and interest groups testifying at hearings on these policies without publics is expected given the lack of direct, economic risks. Further, even though the general energy issue is considered as having a public, the hearings largely cover appropriations for the U.S. Department of Energy and related agencies. Findings from Chapter Four, show that bureaucrats are

[35] These specific issue areas are taken directly from the Policy Agendas Project's content coding scheme. The major topic code for Energy policy is comprised of these nine subtopics. See www.policyagendas.org for their full coding scheme.

much more likely to testify at appropriations hearings, leaving less room for other witness types.

The supply of available information, how active interest groups and businesses are, is dependent on the issue area. Businesses and interest groups want to influence policy making in favor of their preferences, but will only put forth the resources and effort to supply information when they are adequately motivated. For businesses and interest groups, especially trade associations, professional associations, and unions, the main motivation for engaging in politics it to protect against private economic risks. These policy areas addressing private risks have active, diverse publics competing to provide information to Congress. In short, businesses and interest groups are most likely to testify in the policy areas in which they are the most active and most likely to have pertinent information.

Prioritization of Information in Energy

Each congressional committee has an overarching goal—constituency service, making good public policy, or power within the chamber. Committees prefer information that is most likely to facilitate their goals. For instance, a constituency committee prioritizes sources of information that are most likely to help members serve their constituents. In energy policy, constituent committees are likely to prioritize key clientele or important businesses within their communities. Table 13 shows the specific filtering expectations for each committee type—who will receive the most attention from constituency, power, and policy committees. The table also offers examples of the expected witness types.

Table 13: Prioritization Expectations by Committee Type in Energy, 1995-2010

Committee Type	Prioritization Expectations *(Who Testifies)*	Example Witness
Constituency	Businesses	President of Shell Hydrogen LLC
	Interest Groups	Member, Sierra Club
	State and Local Gov'ts	Dir., AZ Dept. of Water Resources
	Others	Parent of Pipeline Victim
Policy	Interest Groups	United Automobile Workers
	Members of Congress	Joe Baca D-CA
Power	Bureaucrats	Director, DOE.
	Members of Congress	Thomas M. Barrett D-WI

Constituency committees prioritize information generated by businesses, interest groups, state and local governments, and individual constituents. These four groups are most likely to represent the committees' clientele and constituents. Policy committees pay most attention to interest groups and members of Congress because these witness types are most likely to provide the information to reinforce previously held policy positions. Power committees prioritize information generated by bureaucrats and members of Congress because these witnesses provide the most information on the inner workings of the federal government as well as reinforce the prestige and power of the committee members.

Congressional committees choose witnesses to facilitate their goals of constituency service, making good public policy, or gaining power within the chamber. Interest groups are most likely to testify at constituency and policy committee hearings than at hearings held by power committees. Businesses, though, are more likely to testify at constituency committee hearings than at hearings held by the other two committee types.

DATA AND FINDINGS

Congressional policy making requires information on problem definitions, feasibility and cost of solutions, consequences of policy change for upcoming elections, among other things. Who supplies this information to congressional committees has an influence on the problem definition and solution and, ultimately, the new policy. Understanding who supplies information within a given policy area is critical for understanding policy change within that issue. To determine who supplies information within energy policy a dataset of all hearings on that policy area and the witnesses testifying at each hearing was created.

For each congressional committee hearing, all witnesses testifying were collected. Then each witness was coded according to the institution he or she represented at the hearing. See Table 14 for a list of witness codes for private witnesses[36], businesses and interest groups, and the number of each type testifying at congressional committee hearings on Energy from 1995 to 2010. Each witness was first coded into a broad category and, then, into a second, more specific subcategory. For business witnesses, witnesses were coded as representing a large business if the affiliated company had one thousand or more employees and coded as a small business if the company had less than one thousand employees. Interest groups were coded based on their purpose: trade associations, professional associations, unions, or general nonprofits[37].

[36] In the full dataset (see Table 7), there is the Other category that could also be defined as private witnesses. The Other witness category includes individuals, Native Americans, and foreign countries. The total number of witnesses is not large enough (N=106) to include in this particular analysis.

[37] Nonprofit interest groups include all groups not representing an industry, professional group, or unions. These groups include citizen groups, activist groups, and think tanks.

Table 14: Private Witness Types Testifying at Energy Hearings, 1995-2010

Witness Type	Total
Business	
Large Businesses	853
Small Businesses	769
Total	**1622**
Interest Group	
Nonprofits	686
Trade Associations	513
Professional Associations	49
Unions	35
Other	4
Total	**1287**
	2909

This energy policy dataset consists of 826 hearings with a total of 1,287 interest groups and 1,622 businesses testifying from 1995 to 2010. Of the subcategories of witnesses, big businesses are the most frequent testifiers in energy and unions[38] are the least frequent with 853 and 35 witnesses, respectively.

Each hearing was also coded for the type of committee: constituency, policy, or power, which held 504, 279, and 43 hearings on energy, respectively. As with the previous dataset, each hearing was also coded for the presiding committee's level of problem uncertainty. Figure 5 in Chapter Four shows problem uncertainty by committee type in Energy policy. Problem uncertainty[39] in energy ranges from 0 to 0.89 with an average of 0.62. The hearings were also coded for specific energy issue area, refer back

[38] The infrequency of unions testifying in this policy area is possibly partially due to the fact that labor issues, regardless of industry, are coded under labor in the Policy Agendas Project's content coding scheme. For more information, please see www.policyagendas.org.

[39] Refer back to Chapter Three for a discussion of how Herfindahl-Hirschman Index is used to calculate problem uncertainty based off the different topic areas a given committee holds hearings on within a particular month.

to Table 12 for a list of these areas and the average number of private witnesses testifying at each.

Additionally, hearing type, time, energy price and availability, party, chamber, and total number testifying were also controlled for. Referral and appropriations hearings account for 17 percent and 6 percent of all energy hearings respectively. The energy price was measured as the domestic price of oil and ranges from 10.89 to 131.47 dollars per barrel. Energy availability was calculated as energy surplus or the total amount of energy produced less the total amount of energy consumed. Energy surplus ranged from -3.41 to -1.23 quadrillion BTUs. In terms of party and institution controls, Republican majorities, lame duck presidential status, unified government, and the House account for approximately 65 percent, 35 percent, 44 percent, and 62 percent, respectively.

Findings

Negative binomial models were used to estimate the number of bureaucrats and, later, interest groups testifying at congressional committee hearings on energy policy given committee type, specific issue are, and problem uncertainty.[40] To refresh, based on the theory of pluralistic information processing, the work on policies and publics (May 1991), and this new approach to information prioritization, the following are the expectations findings:

> 5: The subsystem actors that are capable of supplying information vary by specific policy area.

[40] As explained in Chapter Four, a negative binomial model is appropriate for this data given that the dependent variable is a count of witnesses testifying at a given hearing. Further, given the overdispersion of the data the negative binomial model is more appropriate than a simpler model like the Poisson count mode.

5a: Policies with publics have more diverse set of actors competing to supply information so committees are able to prioritize a wider range of actors.
5b: Policies without publics have limited set of actors supplying information so committees are limited to the groups they can prioritize, usually bureaucrats or other technical experts.

In short, businesses are expected to testify at higher numbers at hearings held by constituency committees; whereas, interest groups are expected to testify more frequently at constituency and policy committees. Hearings on policies with publics—general energy, electricity, gas and oil, coal, alternative and renewable energy, and energy conservation—are expected to have greater numbers of witnesses representing businesses and interest groups given these groups are most likely to be active in supplying information in these areas.

Businesses

The findings for the negative binomial model predicting the number of witnesses testifying at a given hearing in energy who are representing businesses are shown in Figure 11. As with the previous plots, the dots are the coefficient estimates and the horizontal lines through those dots are the 95 percent confidence intervals. If these confidence bands do not cross the vertical line at zero, the coefficients are statistically significant. (The full results are presented in Table E2 in Appendix E.) The baseline variables for congressional committee and energy topic are constituency committee and general energy issues, respectively.

The two most important findings are that (1) there does not appear to be differences in how the three congressional committee types prioritize business witnesses and (2) there are differences in the number of businesses testifying at energy hearings by topic. Constituency, policy, and power committees prioritize businesses as sources of

information at the same rates. This finding is unexpected given that constituency committees, which prefer clientele groups as information sources, should prioritize businesses (clientele) more frequently than other committee types. Committees as a whole, though, appear to prioritize businesses at different rates depending on the specific energy issue being discussed. More witnesses representing businesses testify at hearings on electricity, gas and oil, coal, and alternative and renewable energy than other issue areas. These issue areas are all policies with publics or issues that have private economic risks which act to motivate businesses to be active in the information supply process. The more active businesses (or other subsystem actors) are in the information supply process, the more likely they will be prioritized as sources of information by Congress. Businesses are also far less likely to testify at hearings on nuclear energy policy. Nuclear energy is a policy without a public because the risks associated with policy are public. Businesses are less likely to be active in the supply process given the public risks, but also less likely to have the information necessary for policy making. The Nuclear Regulatory Commission is one of few institutions with the necessary information for policy making in this area.

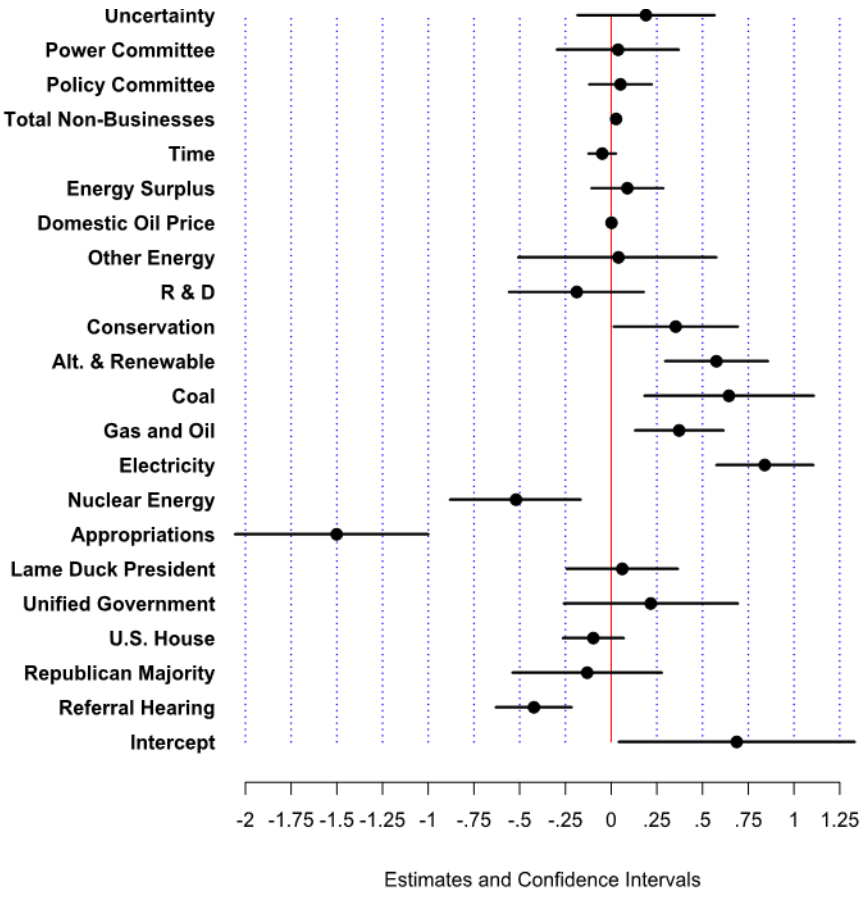

Figure 11: Negative Binomial Model: The Number of Businesses Testifying at Committee Hearings on Energy Policy 1995-2010

Few of the control variables relate to the number of businesses testifying at congressional committee hearings on energy. One exception is in hearing types. Witnesses representing businesses are less likely to testify at referral hearings (legislative hearings and much less likely to testify at appropriations hearings. As discussed in the previous chapter, appropriations hearings regard the funding of the federal bureaucracy and rely heavily on the testimony of federal bureaucrats. On other interesting finding is that uncertainty is not related to the number of witnesses representing businesses. This null finding further supports the idea that bureaucrats

have an information advantage, particularly when committees are faced with problem uncertainty.

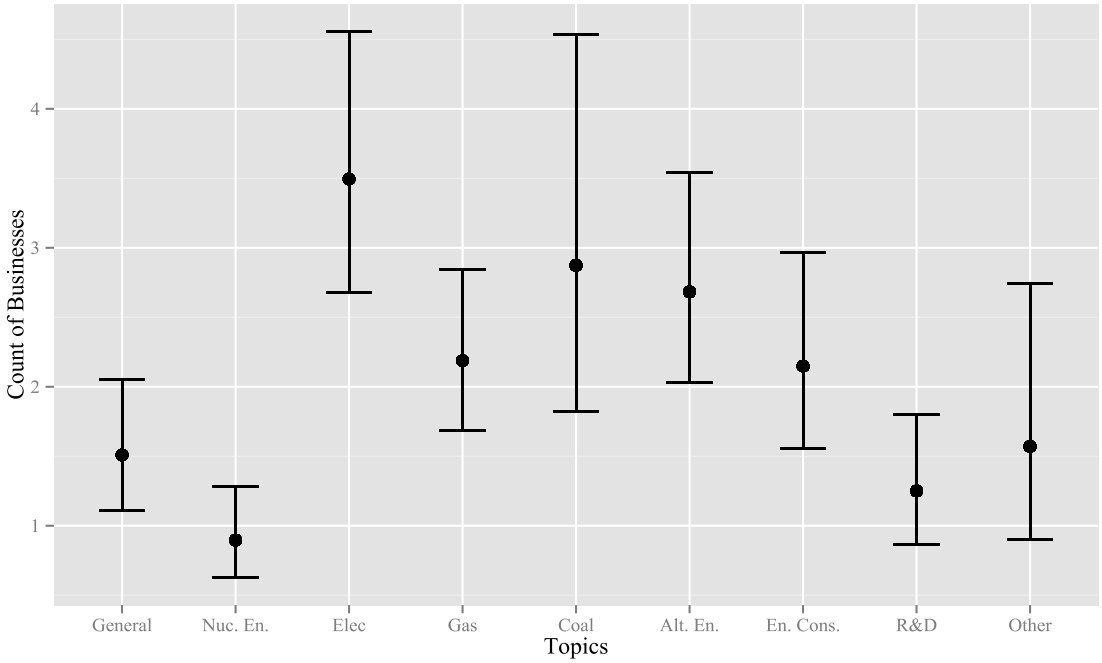

Figure 12: Predicted Probabilities for the Count of Businesses Testifying at Congressional Committee Hearings by Energy Topic, 1995-2010

The negative binomial results are difficult to interpret directly. Therefore, Figure 12 shows the predicted probabilities for the count of businesses testifying at congressional committee hearings in energy policy from 1995-2010. Businesses are predicted to account for 3.5 witnesses at a committee hearing on electricity policy. To put this number in perspective, an average of seven witnesses testify at a given congressional committee so 3.5 business witnesses account for 50 percent of the average hearing panel. Similarly at hearings on coal policy, almost 3 business witnesses are predicted to testify at committee hearings or roughly 43 percent of the witness panel. In contrast, less than 1 witness representing a business is predicted to testify at a hearing on

nuclear energy policy. In short, the hearings on policies with publics (general energy, electricity, gas and oil, coal, alternative and renewable energy, and energy conservation), for the most part, have more businesses testifying than at those hearings on policies without publics.

Table 15: Business Witnesses by Industry Type in Energy Policy, 1995-2010

Business Witness Type	Total
Agriculture	19
Extraction (Drilling and Mining)	291
Utilities	397
Construction	56
Manufacturing	325
Retail, Trade, Accommodation, and Food Service	62
Transportation and Warehousing	81
Information	38
Finance, Insurance, and Venture Capital	101
Real Estate, Rental, and Leasing	5
Professional, Consulting, and Management	188
Administrative and Waste Management	14
Health Care and Social Assistance	4
Arts, Entertainment, and Recreation	7
Unidentifiable/Other	34
	1622

Businesses obviously face different private, economic risks. In energy, these differences in economic risks are best illustrated by the differences between extraction and mining companies and companies manufacturing alternative sources of energy. Extraction and mining companies benefit from policies promoting a greater reliance on fossil fuels, while energy manufacturing companies benefit from the exact opposite. To take a close look at which industries are being represented by the businesses testifying at

energy hearings during this time frame, business witnesses received an additional code based on the industry to which they belong.

A simplified version of the North American Industry Classification System[41] (NAICS) codes were used to categorize the witnesses based on the companies they were representing. Table 15 has a list of the industries that were represented by witnesses testifying in energy from 1995-2010. The industries receiving the most attention during this time include extraction (ex. drilling and mining), utilities (ex. electricity, gas, and water), and manufacturing (ex. solar, wind, and automobiles). These industries were responsible for 291, 397, and 325 witnesses during this time frame, respectively. These industries having being prioritized as information suppliers in energy is expected for two reasons. First, these industries are motivated by private, economic risks to get involved in policy making to influence policy towards their specific preferences. Second, the businesses' expertise in these areas as well as the probability that many are valuable clientele of constituency-focused members of congress makes them important sources of information.

The business witnesses were then collapsed into four categories: construction and manufacturing to account for alternative energy industries[42], extraction and mining to account for fossil fuel industries, utilities to account for utility industries, and other which accounts for all other witness types. A summary of these witnesses with

[41] North American Industry Classification System is the standard coding scheme used by the US government to classify businesses in order to collect data related to the economy. (See the U.S. Census for more information on the full NAICS.) For this project, the businesses were coded into the highest level of the codes. For example, all manufacturing, regardless of their sub-classifications, were coded as 31 for manufacturing. See Table 15 for a list of industry codes used here.

[42] Companies building salt stacks, windmills, solar panels, and other alternative sources of energy were coded as manufacturing. Unfortunately this category of business witness also includes a small number of other manufacturing types, including automobile manufacturers. Construction companies are responsible, at least in this dataset, for installing manufactured alternative sources of energy as well as alternative forms of heating and cooling. As with manufacturing category, there are a few non-energy construction companies, such as home builders, but they are a small minority in this dataset.

examples of each is shown in Table 16. Construction and manufacturing witnesses in this dataset are largely from energy companies focused on making energy (solar and wind). This category also includes all other manufacturing and construction, including automobile manufacturers and home construction companies. Extraction witnesses represent resource extraction companies—oil and gas extraction and coal mining. Utility witnesses are those from utility companies—mainly electric companies, but includes all utilities types. All other industries are coded as other, including consulting and financial businesses. Construction and manufacturing, extraction and mining, and utility companies make up approximately two-thirds of all business witnesses.

Table 16: Business Witnesses by Type Testifying at Energy Hearings, 1995-2010

Business Witnesses	Examples	Total
Construction/Manufacturing	Solar Turbines, Inc.	381
Extraction	CONSOL Energy	291
Utilities	American Electric Power	397
Other	Goldman Sachs	553
		1622

Over time, there has been a push in energy policy to move more toward conservation and alternative and renewable sources of energy and away from fossil fuels. This push towards alternative sources of energy has been the result of increases in both gas prices and the desire for energy independence as well as a greater understanding of air pollution and climate change. With this data, it is possible to see if alternative and renewable businesses testify in greater numbers over time. Figure 13 shows the count of witnesses in each business category at congressional committee hearings on energy by month from 1995-2010.

The dark black of construction and manufactured energy businesses seems to become more pronounced over time. Specifically in the early to mid-2000s, construction and manufacturing business (a proxy for alternative and renewable energy businesses) become more prominent as witnesses testifying at congressional committees on energy policy. The move to prioritize information from alternative and renewable energy businesses seems to occur around the same as Hurricanes Katrina and Rita hit the gulf coast in 2005, the U.S. was engaged in war in the Middle East, and gas prices went over $3.00[43] for the first time in July of 2006. The combination of the high prices of gasoline and instability in the oil production and refinement led policy makers to take greater interest in alternative sources of energy and therefore alternative sources of information. The attention shift in energy policy appears to be reflected in the information prioritized at congressional committee hearings.

[43] Energy Information Administration (www.eia.gov)

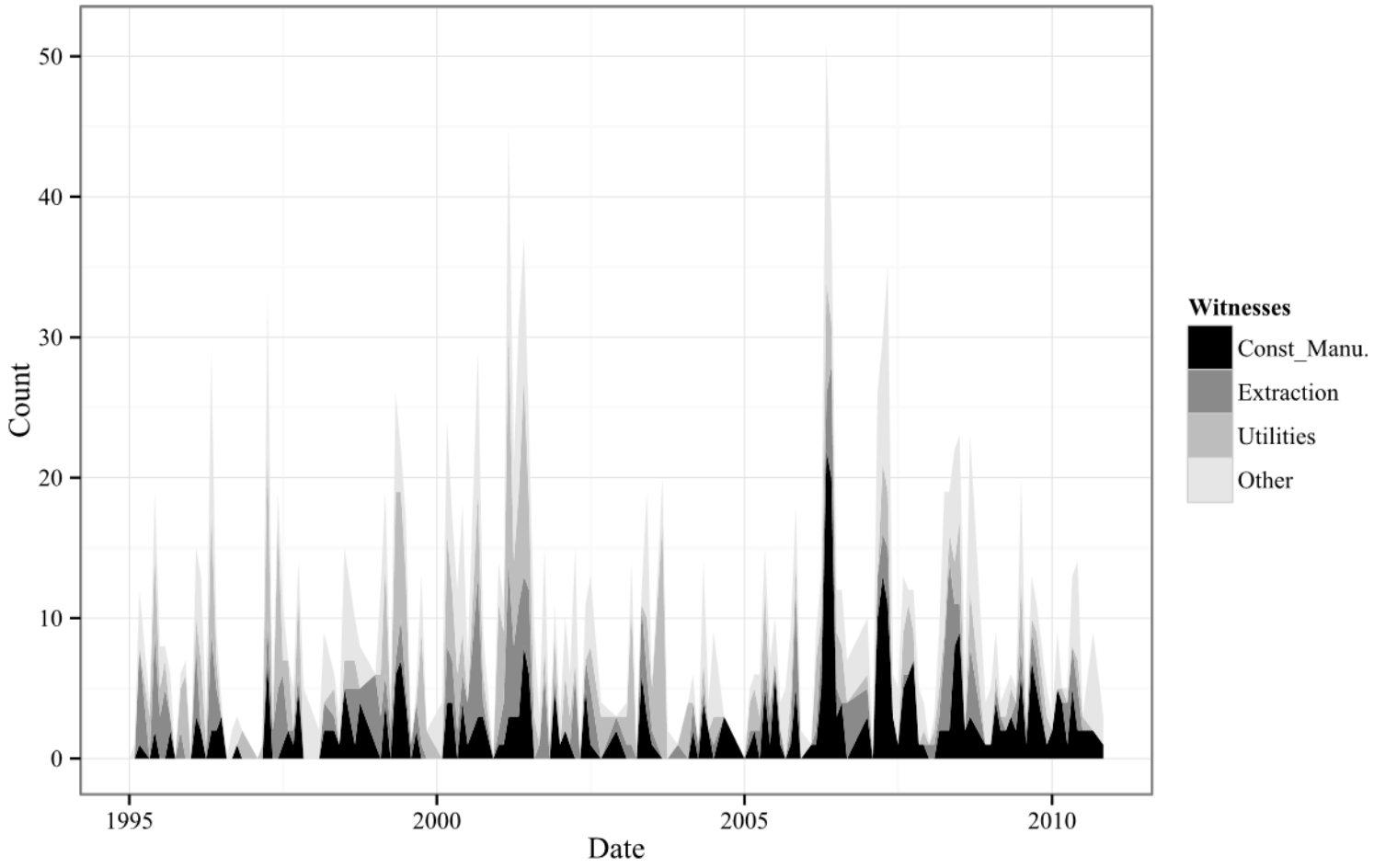

Figure 13: Area Plot of the Count of Business Witness Types Testifying in Congressional Committee Hearings on Energy, 1995-2010

Witnesses representing businesses testify at higher rates at hearings on policies with publics that at hearings on policies without publics. This finding is expected because businesses are more active as information suppliers when there are greater economic stakes attached as in policies with publics. And, in these areas, they are most likely to have the capacity to supply useful information. Unfortunately there is little evidence in differences in how committee types prioritize businesses as sources of information. Also, when looking at specific industries, though, it does appear that alternative and renewable energy businesses have become more prevalent as sources of information over time. An increase in these businesses as information suppliers is consistent with a shift in congressional attention to alternative and renewable energy policy.

Interest Groups

The same analysis done for businesses was repeated for interest groups testifying at congressional committee hearings. The findings for the negative binomial model predicting interest groups testifying at congressional committee hearings is presented in Figure 14. (See Table E2 in Appendix E for full results). The plot can be read the same way as the previous models, with the dots as coefficient estimates and the horizontal lines as the 95 percent confidence intervals. The baseline variables for committee type and issue area are constituency committee and general energy, respectively.

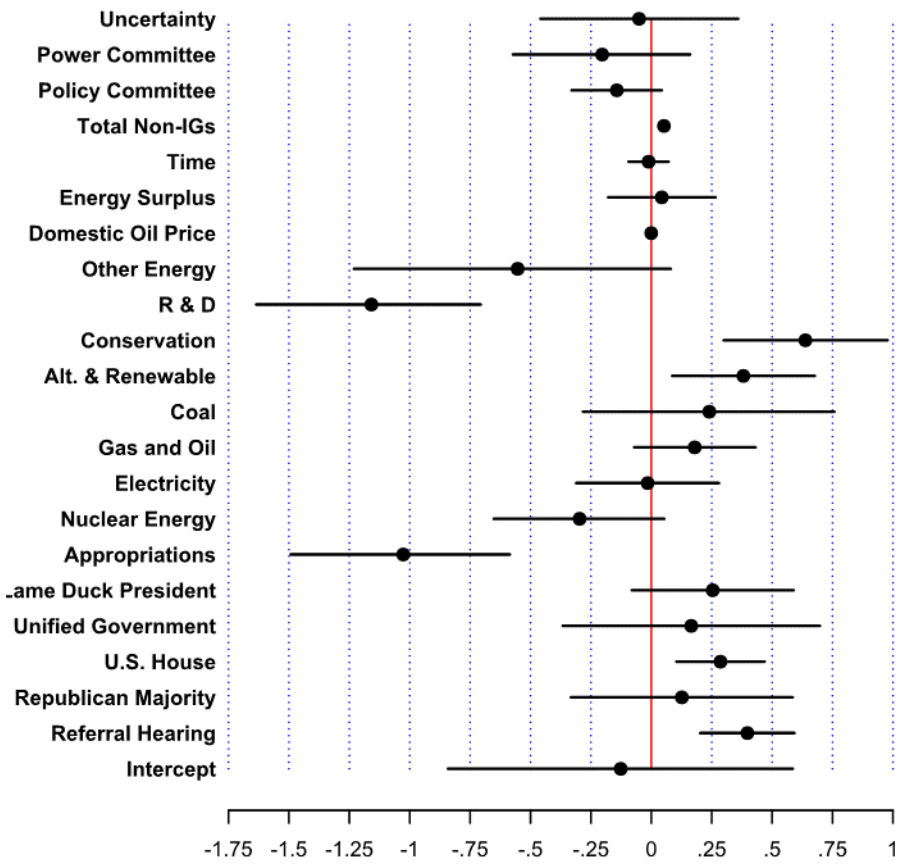

Figure 14: Negative Binomial Model: The Number of Interest Groups Testifying at Committee Hearings on Energy Policy 1995-2010

As with the business witnesses, interest groups do not appear to be prioritized at different rates by the three congressional committee types. However, there are some differences in the number of interest groups testifying across energy issues. Interest groups are most likely to testify at hearings on alternative and renewable energy and energy conservation, both of which are policies with publics. Interest groups are least likely to testify, though, at hearings on energy research and development, which is a

policy without a public. These findings provide more support for differences in information supply between the two types of policies.

Similar to the findings for businesses, interest groups testifying is not associated with the problem uncertainty, which reinforces the findings of Chapter Four. Interest groups are less likely to testify at appropriations hearings, most likely because of the focus on the federal bureaucracy. Interest groups, though, are more likely to testify at referral (or legislative) hearings on energy, which may be due to their ability to supply policy expertise and partisan cues (this is especially true for many citizen groups and think tanks). Increased number of all witnesses invited to testify is also positively associated with the number of interest groups invited to testify. As Congress invites more interest groups as they invite more witnesses overall.

The last finding of note is that more interest groups testify at hearings held by the House than at those held by the Senate. This may be due to the time, resource, and professionalization differences between the two chambers. The interest groups may help alleviate the resource and expertise deficiency of the House due to less resources and a greater need to continually campaign for re-election.

Again, negative binomial results are easiest to interpret when shown as predicted probabilities. Figure 15 displays the predicted probabilities for the number of interest groups testifying at energy hearings from 1995-2010. In general, interest groups do not testify frequently in energy policy, with less than two interest groups predicted to testify at a hearing on any given topic. Approximately, 1.75 interest groups are predicted to testify at energy conservation hearings. At hearings on energy research and development, only about one-quarter of an interest group is estimated to testify or about one interest group per four hearings on this topic.

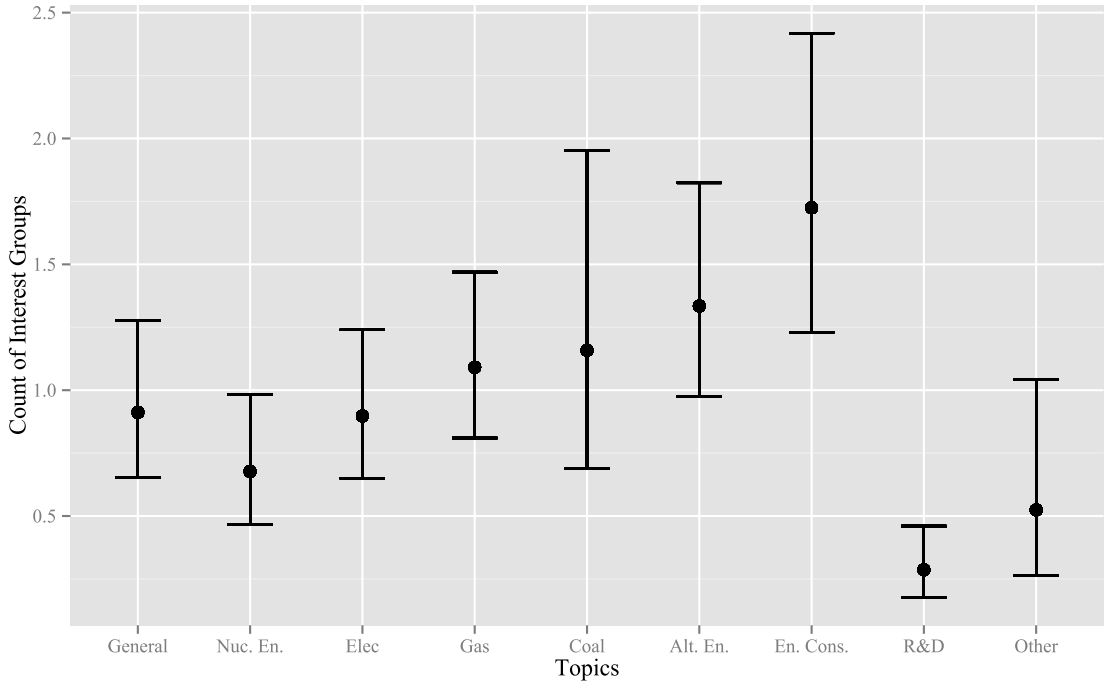

Figure 15: Predicted Probabilities for the Count of Interest Groups Testifying at Congressional Committee Hearings by Energy Topic, 1995-2010

The findings for interest groups provide some support for the new approach to information supply and prioritization. In terms of supply, interest groups are most active in policies with publics and least active in policies without publics, as predicted. However, in terms of the ways in which interest groups would be prioritized at higher levels by constituency and policy committees, there was no support.

Conclusions

Subsystem actors readily supply information to Congress in hopes of influencing problem definitions and the policy-making process. Congressional committees must sort through this oversupply of information, deciding what to attend to and what to ignore. Committee hearings offer a convenient way for committees to prioritize the subsystem-generated information, choosing who testifies and who does not.

Committees, though, can only prioritize those sources of information that are available, which varies by policy area.

This chapter investigated how committees filter private, subsystem-generated information based on their overarching priorities—constituency service, making public policy, or power and prestige—and the issue areas in energy. Using a dataset of all congressional committee hearings on energy from 1995-2010, the findings presented herein show that committees do, in fact, filter information consistent with the policy characteristics of specific energy issues. No evidence, though, supports the expectation of committees' information preferences reelecting their overarching priorities.

Overall, the findings presented in this chapter show that information tradeoffs are necessary from one policy area to another. At electricity policy hearings, for example, are predicted to make up about half of the entire witness panel. Information supplied at hearings can influence the policy-making activities of the committee. Therefore, when a committee favors a certain witness type at the expense of others it can have a major impact on policy.

Chapter 6: Prioritizing Public Sources of Information in Energy Policy

The examples from the Energy Independence and Security Act of 2007 (EISA) showed that not only were businesses and interest groups sharing information with Congress to define the problem and steer debates, public actors, such as members of Congress and states and localities, were also very active in the information supply process. Even though public and private actors differ in their motivations to share information with Congress, both actor types are interested in shaping problem definitions and ultimately the policy process to mirror their specific policy preferences.

This chapter continues in the same vein as the previous one, looking at the supply and prioritization of information in energy policy. Whereas the previous chapter investigated the prioritization of private witnesses—interest groups and businesses—this chapter focuses on public witnesses, specifically federal bureaucrats, states and localities, and, to a lesser extent, member of Congress. The motivations of public officials—elected and unelected—differs from those of private witnesses.

The following sections will overview the motivations of federal bureaucrats, states and localities, and members of Congress in the information supply process. Later sections review how committees are expected to prioritize these witness types given committee goals and issue characteristics. The final section will present the findings showing support for the new approach to information prioritization presented by this project.

INFORMATION PROCESSING IN ENERGY POLICY

There are three parts to information processing in any policy area: supply, prioritization, and application. The process is characterized by subsystem actors competing to supply information to Congress in an effort to affect policy change.

Prioritization is the process by which congressional committees, the information processing arm of Congress, determine which sources of information to attend and which to ignore. The application of information is actually taking what was learned from the information prioritization and choosing whether to apply it to the problem definition process.

The following sections will discuss the motivations for public witnesses to supply information to Congress, when each witness type is more or less likely to be active in the supply process across the different issue areas in energy policy, and how congressional committees are expected to prioritize the information supplied.

Public Sources of Information

Public sources of information[44]: federal bureaucrats, state and local bureaucrats and elected officials, and members of Congress, differ in their motivations for supplying information in the policy making process. The generation of information for greater knowledge is a goal for federal bureaucracies and state and local bureaucrats. These actors generate information without necessarily having a specific policy preference as we would expect from businesses and interest groups. On the other hand, these actors have constituency groups they are representing to Congress. While these actors might not be motivated by market principles like businesses, they are motivated to better their constituents via preferred problem definitions and extended budgets. This section reviews the motivations of public sources of information in the information supply process and the expectations for their level of activity across issue areas.

[44] Public institutions, hospitals and universities, would also be included in this category. In this particular policy area, though, only 258 witnesses represented public institutions during this 16 year time frame. In health care, for example, these institutions play a much more active role in supplying information to Congress.

Federal bureaucrats are motivated to supply information to Congress for a variety of reasons. For many bureaucratic agencies, such as the Energy Information Administration, they were created solely for the purpose of generating policy information for policy makers. Bureaucrats are also frequently compelled to testify at congressional oversight hearings. Beyond their legal obligations to supply information, bureaucrats are often eager to offer information to Congress for two self-interested reasons: expanding their budgets and ensuring their jurisdictions (see Dery 1984; King 1997; and May, Sapotichne, and Workman 2009). Bureaucrats are not always trying to expand their jurisdictions as May and colleagues (2009) point out, they often are trying to protect the status quo.

State and local governments often supply information to Congress to garner monetary support for state and local projects (see Pelissero and England 1987). The federalist system in the U.S. means that lower levels of government depend on grants, subsidies, and other types of federal funding. Therefore, bureaucrats and elected officials from states and localities as well as broad sub-national government associations (ex. National Conference of State Legislators) are motivated to supply information to Congress in hopes of expanding their budgets via federal funding. In the earlier Energy Independence and Security Act of 2007 example, localities were supplying information to Congress in hopes of redefining energy independence as independence from fossil fuels. Their end goal was to secure federal subsidies for producing alternative forms of electricity. These subsidies would have provided a large amount of funding to states and local governments to potentially create new jobs and lower both energy costs and pollution. States and localities, especially bureaucratic agencies from these governments, are also motivated to share information to Congress about innovated policies from their states (see Boushey 2010 for a discussion of policy diffusion).

Congressional hearings offer committee members not only the opportunity to gain information from subsystem actors, but also from fellow members of Congress. In fact, many members of Congress frequently testify at committee hearings to broadcast information to the chamber and the greater policy community as well as take stances for their constituents (see Diermeier and Fedderson 2000). Hearings allow members to broadcast their information to the broader policy community and their constituents given the extensive coverage of hearings on C-SPAN and other media outlets.

The analysis in this chapter focuses on federal bureaucrats and states and localities testifying at hearings on energy. Unfortunately, the number of hearings with witnesses representing members of Congress is too low for the model to estimate. Though, there is some anecdotal evidence that members of Congress come out in large numbers to testify when the stakes are high. Specifically, there were two hearings on the Energy and Water Development Appropriations for 1996[45] that had a total of 133 and 168 witnesses testifying. Close to 30 percent of these 301 witnesses at two hearings were members of Congress. It seems that most of these members were testifying in hopes of increasing the federal funding for energy and water development projects in their districts. For example, Representative Jim McCrery (R-LA) testified before the House Committee on Appropriations Subcommittee on Energy and Water Development in March 1995 (Energy and Water Development Appropriations 1995). He was testifying in support of multiple projects in the Red River Valley.

The supply of information is determined by the individual motivations of subsystem actors and the characteristics of the policy area. Each subsystem player has different motivations for supplying information to Congress. Businesses, for example,

[45] Two hearings on the Energy and Water Development Appropriations for 1996 CIS 95-H181-48 (133 witnesses) and 95-H181-49 (168 witnesses).

often are motivated to supply information to Congress for economic reasons. Alternatively, some bureaucracies were created for the sole purpose of generating policy information. How motivated an actor is to supply information is partially determined by the policy area. As May (1991) points out, some policy areas are associated with private economic risks, ensuring that private companies and their associates are going to be highly motivated to supply information that favors their policy preferences. Some policy areas, though, are associated with public risks that do not directly affect private subsystem actors. In these areas, such as energy research and development, bureaucrats are going to be the most active information supplier.

Those issues with publics, such as electricity and gas and oil, are more likely to address private economic risks (see May 1991). Fear of private economic risks motivate businesses and related actors to become more active in the information supply process. They hope that by sharing information they are able to shift policy in their favors and minimize their individual risks. For public witnesses, such as members of Congress and states and localities, they are also motivated to supply information on behalf of their clientele or constituents in these areas in hopes of lowering the risks for the key companies in their districts. In the EISA 2007 example, Representative Dingell (D-MI) was active in his support of General Motors. He hoped to lower the risks associated with increased CAFE standards for a key clientele company.

Many states and localities also supply information in these areas in hopes of expanding their budgets and their ability to supply these energy resources to constituents. Again, during the debates on EISA 2007, states and localities shared information with Congress in hopes of increasing the federal funding in their areas for alternative and renewable innovations in electricity production.

In policies without publics, though, federal bureaucrats are most likely to be active in the information supply process. These policy areas are associated with public risks rather than private risks (May 1991). It is assumed that the public will absorb the costs of public risks and, therefore, most witness types are unlikely to be motivated to supply information. The exception is bureaucrats who are legally bound to engage in policy surveillance, collect, and generate information in these policy areas. These bureaucrats are, then, more likely to be active, and therefore testify more frequently, in polices without publics than the other witness types.

Table 17: Congressional Committee Hearings and Witnesses by Issues and Publics in Energy Policy, 1995-2010

Energy Subtopics	Public	Number of Hearings	Ave. No. of Bureaucrats per Hearing	Ave. No. of States & Localities per Hearing	Ave. No. of MoC per Hearing
General	Yes	132	2.42	0.32	0.30
Nuclear Energy and Nuclear Regulatory Commission Issues	No	75	2.48	0.43	0.41
Electricity and Hydroelectricity	Yes	112	2.09	1.95	0.73
Natural Gas and Oil	Yes	235	1.60	0.90	0.38
Coal	Yes	20	1.45	0.65	0.10
Alternative and Renewable Energy	Yes	111	1.34	0.44	0.08
Energy Conservation	Yes	59	1.08	0.48	0.71
Research and Development	No	64	2.64	0.08	0.05
Other	No	18	2.83	0.28	0.39
Overall		**826**	**1.91**	**0.73**	**0.37**

Table 17 shows the congressional committee hearings and witnesses by issues[46] and publics in energy policy. Hearings on natural gas and oil account for one quarter of the hearings in energy during this time frame. Hearings on general energy issues, electricity and hydroelectricity, and alternative and renewable fuels account for a little more than 100 hearings each.

Committee hearings on issues of nuclear energy, general energy, research and development, and "other" have the highest averages of bureaucrats testifying. These issue areas are, for the most part, those considered to not be associated with active publics. The highest average of states and localities testifying is at hearings on electricity and hydroelectricity, a policy associated with a very active public. Members of Congress testify at much lower rates than other witness types, but most frequently appear at hearings on electricity and hydroelectricity and energy conservation (both of which are policies with publics). Overall, bureaucrats testify most frequently at hearings on policies without publics; whereas, states and localities and members of Congress testify most frequently at hearings on policies with publics.

Prioritization of Information in Energy

The prioritization process is based on the goals of the congressional committees. Members of Congress self-select onto committees based on their top goal: constituency service, making good public policy, or gaining power and prestige within the chamber. Each committee, then, has one overarching goal in common. Members of constituency committees, such as House Agriculture or Senate Armed Services, all share a common goal of constituency service. Policy committees, such as House Commerce or Senate Health, have a commonly shared goal of making good public policy. House Ways and

[46] These hearings are coded according to the Policy Agendas Project's content coding scheme. See the Policy Agendas Project for full detail on their content coding scheme (www.policyagendas.org).

Means and the Senate Budget Committees are examples of power committees, in which committees share a common goal of gaining more power or prestige within the chamber.

These shared goals do not mean that the individual members agree on problems or solutions. It does imply, though, that the shared goals will lead to shared preferences for information sources. Constituency committees, for instance, prefer information from constituency and clientele groups. Members from the Republican Party may prefer different individual actors than those from the Democratic Party, but members from both parties prefer the same type of information source: constituent and clientele groups. The same is true for the other two committee types. Policy committees prefer information from policy coalitions, such as interest groups and fellow members of Congress. Power committees prefer information from elite sources, such as fellow members of Congress and presidentially appointed bureaucrats. In short, congressional committees prioritize information that will facilitate the achievement of their shared goals.

DATA AND FINDINGS

Public sources of information have different motivations for sharing information in energy policy than businesses and interest groups. Keeping with the previous analyses, the data used here is all congressional committee hearings in energy policy from 1995-2010. The witnesses for each of 826 energy hearings were then collected. Each of the 5,758 witnesses were then coded according to the institution he or she represented when testifying.

Table 18 shows the number of public witnesses testifying (federal bureaucrats, members of Congress, and states and localities) in energy policy. Each public witness below was first assigned to the broad category of government and then to a second, more specific subcategory. Federal bureaucrats make up over one half of all public witnesses,

with 1,578 testifying during this time. Members of Congress testified at committee hearings on energy 305 times, while states and localities testified about twice that number.

Table 18: Public Witness Types Testifying at Energy Hearings, 1995-2010

Witness Type	Total
Government	
Federal Bureaucracies	1578
Members of Congress	305
State & Local Government	603
	2486

Each hearing was also coded for the goal of the presiding committee (constituency service, making public policy, or gaining power within the chamber). Constituency, policy, and power committees were responsible for holding 504, 279, and 43 hearings, respectively. As with previous analyses, every hearing was additionally coded for the presiding committees' level of problem uncertainty[47], hearing type[48], time[49], energy price and availability[50], party[51], chamber[52], unified government[53], lame

[47] See Figure 5 in Chapter Four for the average level of problem uncertainty by month for each committee type in energy from 1995-2010.
[48] There are controls for two types of hearings: referral and appropriations which account for 17 percent and 6 percent of hearings, respectively.
[49] Time is just a simple count for months.
[50] Energy price is calculated as the price of domestic oil in the use, ranging from $10.81 to $131.47 dollars per barrel. Energy availability also called energy surplus is calculated as the difference between the total energy produced and the total energy consumed in the U.S. Energy surplus ranges from -3.41 to -1.23 quadrillion BTUs.
[51] Republican majorities in Congress account for about 65 percent of all hearings in energy during this time frame.
[52] Approximately 62 percent of the hearings in energy during this time were held in the House.
[53] About 44 percent of the hearings on energy came during times of unified government.

duck status of the president[54], and total number of witnesses testifying[55]. Finally, hearings coded for specific energy issue area. (Refer back to Table 17 for a list of topics and the number of witnesses testifying in each area.)

Findings

As with the previous two chapters, negative binomial models were used to estimate the impact of committee goals, issue characteristics, and uncertainty on the number of each bureaucrats and states and localities. Negative binomial models, rather than Poisson models, are appropriate here given the dependent variable is a count model and the data is overdispersed.

As with Chapter Five, the expectations for the findings are based on the theory of pluralistic information processing, the work on policies and publics (May 1991), and this new approach to information prioritization. They are as follows:

> 5: The subsystem actors that are capable of supplying information vary by specific policy area.
> 5a: Policies with publics have more diverse set of actors competing to supply information so committees are able to prioritize a wider range of actors.
> 5b: Policies without publics have limited set of actors supplying information so committees are limited to the groups they can prioritize, usually bureaucrats or other technical experts.

Policies with publics have diverse sets of highly competitive subsystem actors engaged in providing information to Congress. Given the abundance of information suppliers, Congress have less need to rely heavily on information from federal

[54] Only about 35 percent of energy hearings during this time occurred during the final two years of a president's second term.

[55] The total number of witnesses testifying is actually the total number testifying less the number of witnesses of interest. For example, the negative binomial model for bureaucratic witnesses would include a variable for other witness types calculated as all witnesses at the hearing less bureaucrats (or the dependent variable).

bureaucrats. In policies without politics, subsystem actors are less motivated to supply information leaving bureaucrats as one of a few capable sources of information. In these areas, Congress must rely more heavily on federal bureaucrats for information.

The findings from Chapter Five show supporting evidence for the private subsystem actors being more active in the information supply process in policies with publics and less active in policies without publics. The following analyses should show states and localities being prioritized in a similar way to private witnesses. Federal bureaucrats, though, should be more active, and therefore testify more frequently, in policies without publics.

Bureaucrats

The findings from the negative binomial model, which estimates the number of bureaucrats testifying at a given congressional committee hearing on energy policy are displayed in Figure 16. As with previous rope ladder plots, the dots are the coefficient estimates and the horizontal lines are the 95 percent confidence intervals. If the confidence intervals do not cross the horizontal line at zero, the coefficient is statistically significant. (See Table E3 in Appendix E for the full table of findings.)

First, the findings suggest that bureaucrats are less likely to testify at hearings on those policies that have active publics, such as natural gas and oil, alternative and renewable energy, and energy conservation policy. Bureaucrats are less likely to testify in these areas because they are one of many subsystem actors competing to supply information in these policy areas. On the other hand, bureaucrats are most likely to testify at committee hearings on policies without publics, like research and development. In policy areas without publics, Congress tends to rely more heavily on federal bureaucrats given the fewer number of active sources of information.

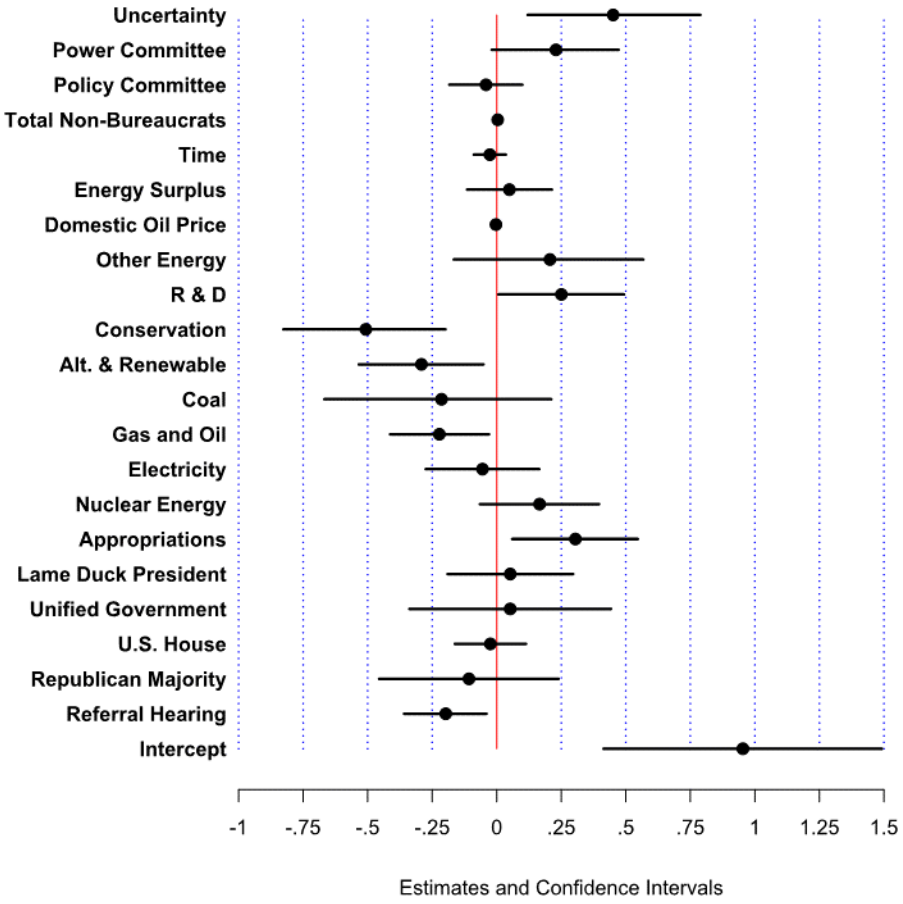

Figure 16: Negative Binomial Model: The Number of Bureaucrats Testifying at Committee Hearings on Energy Policy 1995-2010

Another really important finding in this model is that it reinforces the findings from Chapter Four. Congressional committees call higher numbers of bureaucrats to testify at hearings as problem uncertainty increases. Bureaucrats are the only witness type that is associated with problem uncertainty. This is a clear indication that bureaucrats have an information advantage when members of Congress are unclear about the problem definition or which attribute of the problem is the most important.

Further, the model again shows that bureaucrats are much more likely to testify at appropriations hearings. All other witness types tested (businesses, interest groups, and state and local governments) testify less frequently at appropriations hearings. Appropriations hearings deal primarily with funding the federal bureaucracy which requires information from those with the most information about the bureaucracy…federal bureaucrats. On the other hand, bureaucrats are less likely to testify at referral hearings than other hearing types.

What the findings do not show, however, is additional support for differences in information preferences across committee types. It is unclear why there appeared to be differences in committee preferences for bureaucrats testifying in the full model in Chapter Four that included all three major policy areas and not in this model on energy policy hearings alone. One important note is that power committees invite more witnesses to testify with a statistical significance at 0.1. There are only 43 power committee hearings held in energy which may explain the discrepancy in the two models.

The coefficients from negative binomial models cannot be directly interpreted. Therefore, predicted probabilities for the number of bureaucrats testifying at each energy issue area were calculated. These predicted probabilities are displayed in Figure 17.

Bureaucrats are most likely to testify at the policies without publics: nuclear energy, research and development, and "other" energy issues, which are all associated with public risks. Since these policy areas are not associated with private economic risks, private businesses and interest groups are less likely to be active in the information supply process (see May 1991). With less information available, Congress will rely more heavily on the information available from other sources, specifically federal bureaucrats.

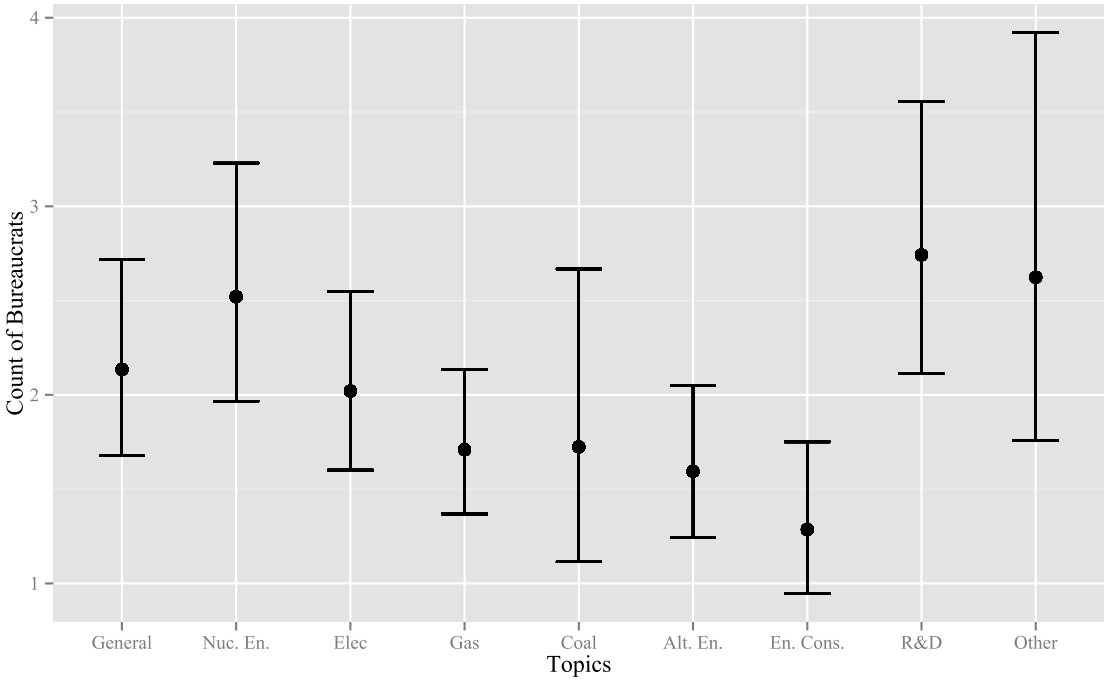

Figure 17: Predicted Probabilities for the Count of Bureaucrats Testifying at Congressional Committee Hearings by Energy Topic, 1995-2010

In nuclear energy policy, for example, about 2.5 bureaucrats are predicted to testify at a congressional committee hearing as compared to less than one interest group or business. In research and development policy, almost 3 bureaucrats are predicted to testify, which is more than both the predicted number of businesses and interest groups combined. In those policy areas with publics, though, that are associated with private economic risks, bureaucrat are less likely to testify. In gas and oil policy, only about 1.75 bureaucrats are predicted to testify at a given hearing; whereas, businesses and interest groups account for approximately 3.5 witnesses combined or about 50 percent of the total panel. It appears that bureaucrats have an important role in supplying information at congressional hearings across issue areas in energy policy. However, in

those policy areas where few other actors compete to supply information, bureaucrats are even more likely to be prioritized by congressional committees.

I recoded the bureaucratic witnesses based on the agencies they represent into one of four categories—defense; energy; land, environment, and agriculture; and other. Bureaucrats representing defense, national security, international relations, and related agencies were coded as defense. Those bureaucrats representing energy agencies, such as the Department of Energy and the Nuclear Regulatory Commission, were coded as energy. Those agencies most likely to deal with issues of conservation, the environment, and agriculture were coded as land. All other bureaucrats were coded as other.

Table 19: Bureaucratic Witness Types Testifying at Energy Hearings, 1995-2010

Bureaucratic Witness Type	Examples	Total
Defense	Dept. of Defense; Dept of State	207
Energy	Dept. of Energy; Nuclear Regulatory Commission	930
Land, Environment, and Ag.	Dept. of Interior; Dept. of Agriculture	247
Other	Dept. of Labor; Office of Personnel Management	194
		1578

Table 19 lists examples of agencies for each bureaucratic witness type and the number of each testifying in energy policy from 1995-2010. By far, bureaucrats from energy-related bureaucracies provided the majority of bureaucratic information during this time. In fact, energy-related bureaucracies testify almost four times more frequently than any other bureaucratic witness type and make up approximately sixty percent of all bureaucrats testifying.

Each bureaucracy looks at a problem from a different angle or expertise and each has the goals of expanding or protecting their budgets and jurisdictions (see King 1997

and Dery 1984). These four different types of bureaucracies represent four distinct sets of policy expertise. The problem definitions generated from information supplied by the Department of Defense, then, should differ greatly from those definitions resulting from information supplied by the Department of the Interior or the Department of Agriculture.

Figure 18 shows the number of bureaucrats testifying each month from 1995-2010 for each of the four bureaucratic witness types: defense, energy, land and environment, and other. It is clear that during the entire time period, bureaucrats from energy-related agencies make up the majority of bureaucratic witnesses. Interestingly though, starting around 2004 bureaucrats from defense-related agencies become more prevalent at hearings on energy policy. Most likely this increase in defense bureaucrats testifying is the result of a greater focus by Congress and the president defining the energy problem as one of energy independence and security. In fact, much of the legislation during the mid-2000s was focused on just that, including the Energy Independence and Security Act of 2007.

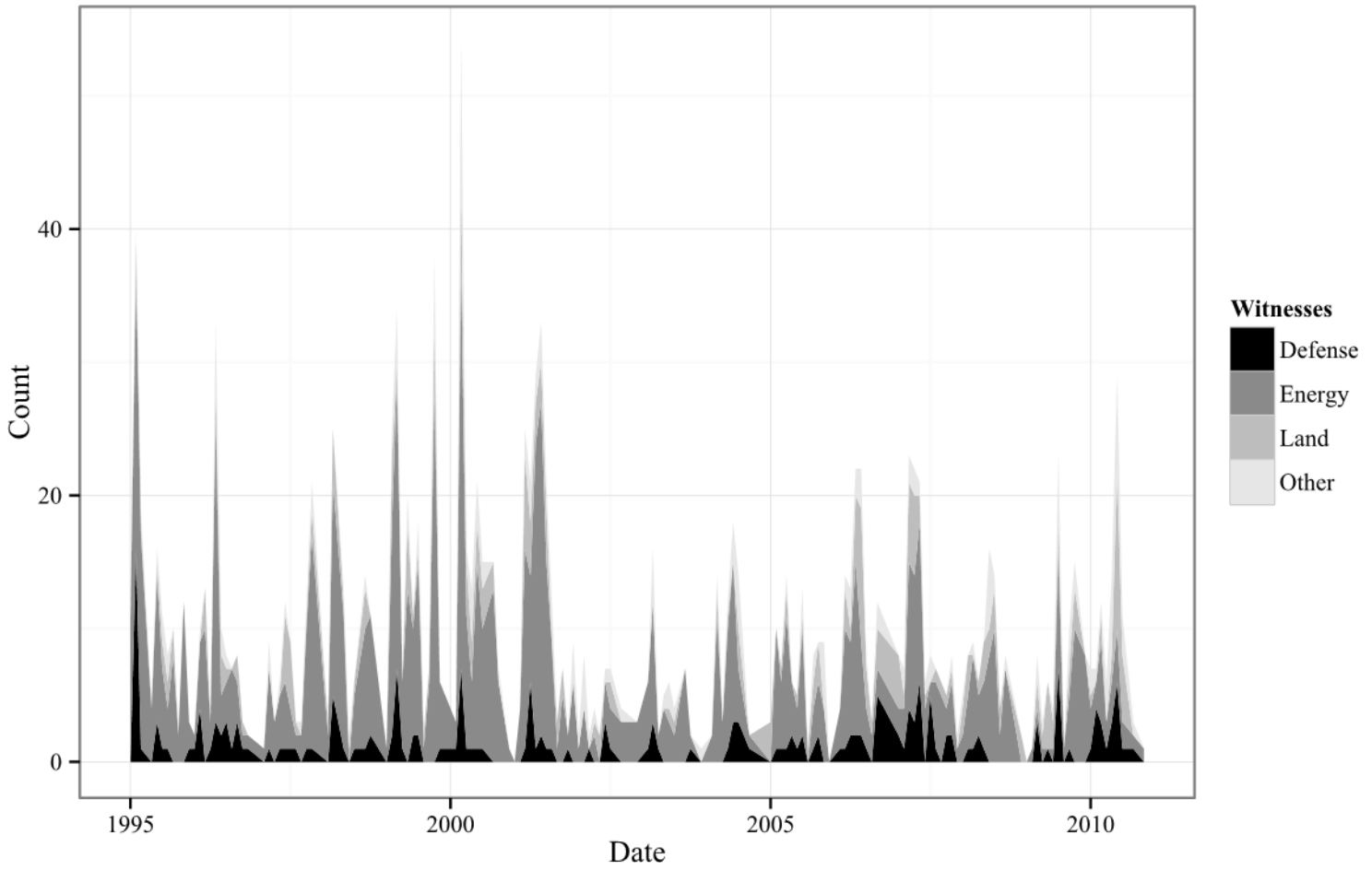

Figure 18: Area Plot of the Count of Bureaucrat Witness Types Testifying in Congressional Committee Hearings on Energy, 1995-2010

For the most part, the findings presented here on bureaucrats testifying at congressional committee hearings in energy policy provide additional support for those presented in Chapter Four. Bureaucrats are the only witness types that are more likely to testify when the problem uncertainty of committees increases. No other witness type is related to problem uncertainty in any way. Bureaucrats are more likely to testify at appropriations hearings while all other witness types are less likely to testify at this type of hearing. The one exception is that there did not appear to be difference in how the different committee types (constituency, policy, and power) prioritize bureaucratic witnesses.

In terms of the policy areas with publics, bureaucrats are, for the most part, less likely to testify. In polices with publics, many different subsystem actors are motivated by private risks to compete to supply information to Congress. In those issues without publics, though, bureaucrats are overall much more likely to testify. Bureaucrats are one of few subsystem actors capable of supplying information in these policies that associated with public risks. When comparing bureaucrats to private witnesses, the differences between the witness types is even more compelling evidence in support of the claim that policy characteristics partially determine how active different witness types are in the information supply process and, therefore, how frequently they testify.

State and Local Governments

States and localities frequently rely on subsidies and grants from the federal government for a variety of projects, from building roads to innovative energy ventures. Unlike federal bureaucrats, these state and local bureaucrats and elected officials will act more like private witnesses in the information supply process. The policies at the federal level of government directly impact what the policies the states and localities are

able to implement, both in terms of legality and funding. States and localities are not only supplying information to protect their own policy preferences, but frequently they are supplying information to protect the preferences of important constituencies or clientele. As a result, state and local governments are going to be more active, and, therefore, more likely to testify at hearings on policies with publics. Policies with publics are, again, those policies associated with private economic risks (see May 1991).

Once again, a negative binomial model was used to estimate the number of witnesses representing state and local governments at hearings on energy policy from 1995-2010. Below, the results are displayed in a rope ladder plot in Figure 19. The dots are coefficient estimates; whereas, the horizontal lines are the 95 percent confidence intervals. If the confidence intervals cross the vertical line at zero, the coefficient is not statistically significant. (See Table E3 in Appendix E for the full list of findings.)

States and localities are most likely to testify at congressional hearings on electricity, gas and oil, and coal policies. These issue areas are all policies with publics that are associated with private risks. Key clientele of state and local governments as well as localities themselves are often responsible for the supply and production of electricity. States and localities are interested in promoting their (as well as their constituents') policy preferences. To ensure their policy preferences are known these governments must be active in the supply process. In policy areas where states and localities do not have a strong stake in the policy outcomes, such as research and development, they are less active and therefore less likely to be invited testify.

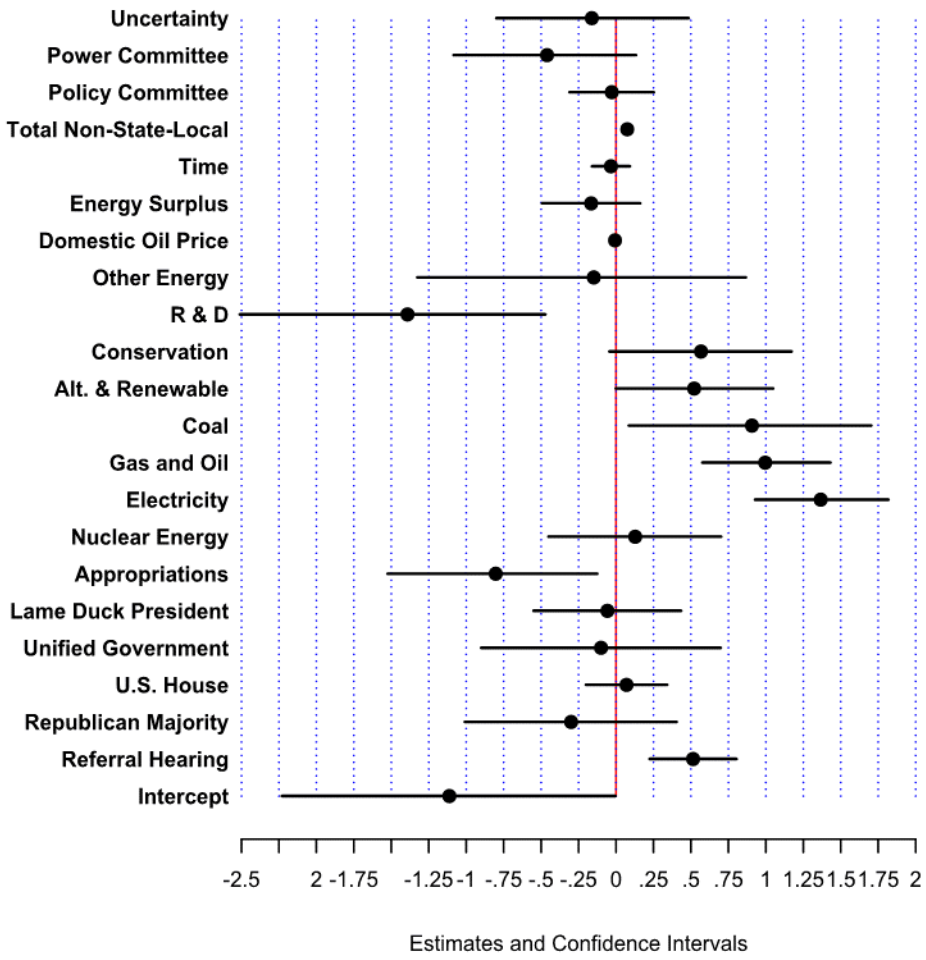

Figure 19: Negative Binomial Model: The Number of State and Local Governments Testifying at Committee Hearings on Energy Policy 1995-2010

Other findings suggest that as Congress invites more witnesses in general, they invite more states and localities to testify. In addition, at referral hearings states and localities are more likely to be invited to testify; whereas, they are less likely to testify at appropriations hearings. Referral hearings are legislative in nature and often deal with understanding policy consequences, many of which can and will directly affect states and localities. Appropriations hearings, on the other hand, deal with funding the federal

bureaucracy and it is unlikely states or localities will have the information necessary here.

Again, the results from the negative binomial model are difficult to interpret directly. Therefore, Figure 20 presents the predicted number of states and localities invited to testify at congressional committee hearings on energy from 1995 to 2010 by specific issue area.

Witnesses representing state and local governments are most likely to testify at hearings on electricity, gas and oil, and coal policies. States and localities account for almost 1.5 witnesses or about 20 percent of a hearing panel on electricity policy. In both coal and gas and oil issue areas, almost 1 witness or about 14 percent of the panel at a committee hearing represents states and localities. These issue areas are all considered policies with publics or policies associated with private risks. These risks may be either risks to the states and localities (ex. electricity policy for locality-run utility company) or their clientele. Either way, states and localities are motivated to supply information in these areas.

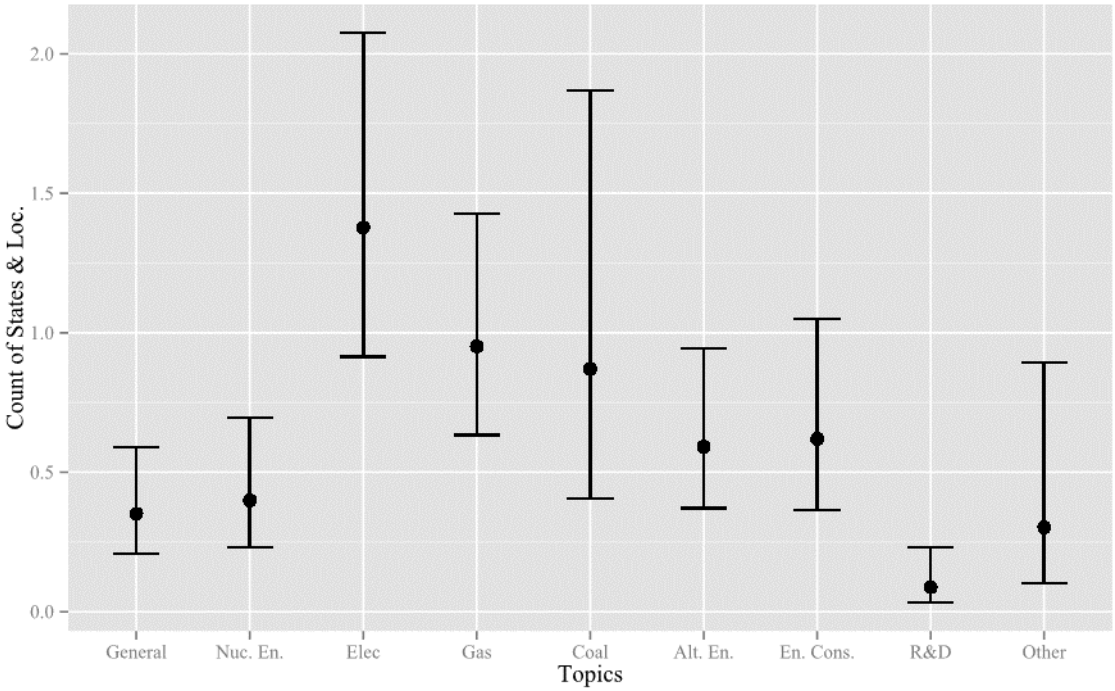

Figure 20: Predicted Probabilities for the Count of State and Local Governments Testifying at Congressional Committee Hearings by Energy Topic, 1995-2010

In nuclear energy, research and development, and "other" energy policies, states and localities are much less likely to testify. These issues are all considered policies without publics, associated with public risks. The risk in these areas is most likely to be absorbed by the federal government and does little to motivate states and localities to supply information. In these areas, federal bureaucrats are most likely to have the information Congress needs to make policy and therefore they rely little on other witness types. In each of these policy areas, states and localities are estimated to testify at a rate of 0.25-0.50 witnesses per committee hearing or about 4 to 7 percent of the average witness panel.

Conclusions

In conjunction with the findings presented in Chapter Five, the findings presented here show that policy characteristics, at least, partially determine which sources of information are invited to testify at congressional committee hearings on energy policy. As predicted, in policy areas with publics businesses, interest groups, and states and localities are more likely to be invited to testify. These policies are associated with private economic risks (see May 1991). These risks motivate this wide range of actors to compete to supply information to Congress. The diversity of information available to Congress in these areas allows them to prioritize a wider range of actors to testify rather than relying on one type of witness or another.

In policies without publics, though, bureaucrats are more likely to testify. Because these policy areas are associated with public risks, there is less motivation for many of the witness types to be actively involved in the information supply process, bureaucrats being the exception. Bureaucrats are often legally obligated to engage in policy surveillance and information generation in these policy areas giving Congress at least one information source it can rely on. As a result in policy areas without publics, bureaucrats are one of a few sources of information available to Congress and, therefore, prioritized to testify more frequently.

In addition, the findings presented in here and in Chapter Five, provide mixed support for Chapter Four findings. In all six models presented in this project, bureaucrats were the only witness type to be associated with problem uncertainty. Consistently in the three models that estimated bureaucrats testifying at congressional committee hearings, bureaucrats were statistically and positively associated with an increase in problem uncertainty. As congressional committees become more uncertain about the problem, regardless of the policy area, bureaucrats testify in greater numbers.

On the other hand, while Chapter Four showed that committees differ in their information preferences and how they prioritize information, neither Chapter Five or Six showed any evidence of this. It may be because the number of different committee types was lower in the later models or the differences in committees' information preferences could be driven by policy differences. Overall, the findings suggest that bureaucrats have an information advantage in times of uncertainty, regardless of policy area, as well as in issues without publics. To a much lesser degree, businesses, interest groups, and states and localities have an information advantage in those policies with publics.

Chapter 7: Conclusions and Future Directions for Information Processing in Policy Subsystems

According to the pluralistic theory of information processing, subsystem actors compete to supply information to Congress. By supplying information, subsystem actors have the opportunity to influence problem definitions, steer policy debates, and, ultimately, influence the policy making process. The potential payoff from supplying information to Congress encourages the competition between the subsystem actors. The result is that Congress is faced with an oversupply of information, which requires congressional committees to prioritize sources of information, choosing which to attend and which to ignore.

This dissertation introduced a new approach to studying the prioritization of subsystem-generated information by congressional committees that focuses on the goals of the committees, policy area characteristics, and problem uncertainty. The information prioritization process is important for understanding which subsystem actors (ex. bureaucrats, businesses, and interest groups) get to help define problem definitions and shape public policy. This project is a first step in really understanding the information prioritization process in terms of the uncertainty committees have over a given policy problem, the varying characteristics of issue areas, and the information preferences of congressional committees.

CONCLUSIONS

The findings presented here show how bureaucrats are prioritized by congressional committee hearings to testify is influenced by policy area, committee type, and the presence of problem uncertainty. In energy specifically, the number of public and private witnesses testifying at committee hearings varies by issue area, with

the number of bureaucrats also varying depending on the committee's level of problem uncertainty.

Bureaucrats and Uncertainty

The number of bureaucrats testifying at congressional committee hearings is partially dependent on the committee's level of problem uncertainty. As problem uncertainty increases so, too, does the number of bureaucrats invited to testify at a hearing. Committees tend to prefer bureaucrats to other sources in times of uncertainty because of the special relationship between the two institutions. Many bureaucracies were created by Congress solely for policy surveillance and information generation. Additionally, bureaucrats and congressional committees work together repeatedly, at various stages of the policy process. Committees, then, have a good idea of any bias the bureaucrats may have and can adjust accordingly. Bureaucrats also have long shelf lives to act as a long-term, stable source of information for Committees.

The effect of problem uncertainty on increasing the number of bureaucrats testifying at congressional committees is especially true for careerist bureaucrats. Careerist bureaucrats differ from presidentially appointed bureaucrats in two important ways. First, presidentially appointed bureaucrats may or may not be policy experts, as evidenced by Michael D. Brown as the director of FEMA during the Hurricane Katrina Crisis. Careerist bureaucrats, though, are hired based on merit and frequently are highly trained professionals at the top of their respective fields. Second, careerist bureaucrats are seen as apolitical; whereas, appointed bureaucrats are viewed as partisan extensions of the president. These characteristics give careerists an even greater information advantage in sharing information with Congress as they are seen as technical and scientific experts.

Other evidence of congressional committees relying more heavily on bureaucrats for information is that the House of Representatives invites more bureaucrats, especially careerists, to testify than the Senate. Members of the House are up for reelection every two years meaning they have less time to invest in becoming policy experts. The chamber, as a whole, also has less resources than the Senate. This finding suggests the House committees turn to bureaucrats to help alleviate their lack of time and resources and provide them with the policy information that they need.

Committees

Committees share a common goal—constituency service, making good public policy, or power within the chamber (Fenno 1973). Committees prefer information that can facilitate their goals. Constituency committees, for example, prefer information from citizens and clientele groups to help them best serve their constituents. This project found mixed support for common committee preferences. Chapter Four findings on committees across policy areas suggests that committee types adapt their information preferences across policy areas. In energy policy, for example, power committee invite more bureaucrats; whereas, policy committees invite fewer bureaucrats. Unfortunately, these findings do not hold up in Chapters Five and Six.

The lack of findings supporting the differences in committees' information preferences in the last two chapters could be for one of two reasons. A much lower sample size in these models, especially for policy committees could be driving the null findings. Another reason could be that the differences in committee preferences is driven by the differences in the three policy areas of domestic commerce, energy, and health care. Extending the detailed analysis of energy to the other two policy areas could help resolve this problem.

Policy Areas

Policies differ from one another in a number of ways, including the venue in which policy change occurs, the preferences driving policy change (ex. constituency, regional, or ideological preferences), and whether or not the issue has publics. Because issue areas differ in these ways, the information necessary, preferred, and available varies as a result. The findings presented here suggest that the information prioritized by committees does, indeed, differ by policy area.

Bureaucrats, for example are much more likely to testify in health and energy policy than in domestic commerce policy. Within energy, there are even clearer differences between those policies with publics and those without publics. In policy areas with publics, a diverse and very active range of subsystem actors, motivated by fear of private, economic risks, compete to supply information to Congress. These areas in energy (ex. electricity, natural gas and oil, coal) have more businesses, states and localities, and interest groups testifying at congressional hearings. Bureaucrats, for the most part, are less likely to testify in these areas than in those without publics. Policies without publics are associated with public risks and are less likely to motivate a diverse set of groups to supply information. For the most part, technical and scientific experts are the most active in the information supply process in these areas. In fact, bureaucrats are more likely to testify in these areas; whereas, businesses, interest groups, and states and localities are less likely to testify here.

Overall, the findings presented here provide support for the new approach to information prioritization presented above. Problem uncertainty, committee goals, and policy characteristics all seem to influence how congressional committee prioritize information, deciding who will testify and who will not. Testimony is important because it not only shows an actor has gained access to Congress, but also broadcasts the

message to the larger policy community. Further, by supplying information to Congress, a subsystem actor is given the opportunity to influence problem definitions, which can help steer policy debates and affect policy change. Understanding who supplies information to Congress and when is necessary for understanding how problem definitions are formed and policies changed.

NEW DIRECTIONS

The research presented here suggests three new directions of study: information search strategies, the impact of prioritized information (testimony) on policy making, and information processing at the individual level. Previous discussions suggest there are two information gathering strategies: narrow, expert search and broad information prioritization. When do congressional committees engage in one search strategy rather than the other? Second, Chapter Two identifies three parts of information processing: supply, prioritization, and application. That is, how is prioritized information applied to the policy process? Does the prioritized information (hearing testimonies) help shape legislation? Third extension of this project is individual information processing. This study is restricted to institutional information processing. Looking at the questions of individual members of Congress at congressional committee hearings will provide a clearer picture of how individuals search for information.

Information Search Strategies

The literature on the pluralistic and classic economic theories of information processing combined with Simon and Newell's (1972) work on problems and solutions suggests that policy makers must adapt to their issue environment when searching for information. Chapter Two argues that the pluralistic theory of information accurately describes the oversupply of information in the problem space, while classic economic

theory better describes the limited and costly nature of information in the solution space. These theories not only suggest that information is generated and supplied differently in these two contexts, but also that congressional information gathering strategies differ as a result. Work by Baumgartner and Jones (2015) suggests that Congress engages in a narrow and focused expert search in the solution space because issues are so well-defined and information is limited. They go on to suggest, when issues are messy and multidimensional as in the problem space, Congress engages in entropic search what is referred to as information prioritization in this dissertation. Information prioritization requires Congress to filter through the oversupply of subsystem generated information and decide what to attend.

While these two strategies operate in two different contexts, no policy will permanently reside in either the problem or solution space. Baumgartner and Jones (1993) punctuated equilibrium theory of public policy suggests shocks or crises as well as new information can lead to policies requiring redefinition. Nuclear energy policy, for example, had to be redefined after the Three Mile Island accident in 1979 (Baumgartner and Jones 1991). The advocacy coalition framework also suggests that players within a policy coalition can learn from one another, leading to new definitions of policy problems (Sabatier and Jenkins-Smith 1993).

As well-defined problems break down, policymakers must adjust their information gathering strategies from one of narrow, expert search to broad information prioritization. When issues are messy and undefined, particularly after a crisis, Congress reacts by gathering information by prioritizing information from a broad range of suppliers. Actors trying to define the problem to mirror their preferences compete to supply information to Congress. Information prioritization strategy allows Congress to

gather a wide range of information to help lower uncertainty surrounding the multiple dimensions of a problem.

As the dimensionality of the policy area increases, committees move away from expert search to broad information prioritization. The composition of witnesses testifying when problems are well-defined is limited to a narrow set of witness types. As the dimensionality of the problem increases, the witness composition broadens to include a greater variety of witness types to inform the importance of multiple attributes. As the problem becomes clearer and the dimensions of the problem decrease, the witness types testifying become more narrowly focused. How committees gather information reflects the nature of the policy area. To test this an entropy or HHI measure can be used to calculate how concentrated (narrow) or broad the hearings panels are based on witness types. Concentrated or narrow hearing panels suggest expert search; whereas, broad, diverse panels suggest information prioritization.

Testimony Impact on Policy Making

The analyses presented here are focus mainly on the first two stages of information processing: supply and prioritization. The next step is to look at how the information that is prioritized, testimony at committee hearings, is applied to the policy making process. The pluralistic theory of information suggests that congressional committees use the information they receive from subsystems to help define problems (Kingdon 1984; Baumgartner and Jones 1993). These problem definitions would then be reflected in committees' markups and amendments to legislation.

One way to test whether prioritization helps shape problem definitions used in legislation is by comparing witness testimony at referral hearings to committee markups and committee amendments. A plagiarism predictor model, similar to those used to

detect cheating on term papers, can determine how much (if any) of the testimony predicts the markup or amendment content. A similar method has been used by Wilkerson and colleagues (2015) to show how language from previous failed bills is used in later policy making attempts.

Information Processing at the Individual Level

The purpose of this dissertation was to explore information at the institutional level—specifically how congressional committees operate as the information hub of subsystems. Congressional committees prioritize information from subsystem actors and broadcast that information to the chamber and broader policy audience. They also deliver messages from the chamber to subsystem actors, especially federal bureaucrats. How the institution processes information is very interesting, but also begs the question: How does this process work at the individual level?

Individual members of Congress differ in terms of their ideological preferences as well as the preferences of their constituencies and clientele. While all committee members may prefer a type of witness, it is doubtful they share the same preference for the specific individuals or messages. When asked, "Which do you think are more effective overall in influencing policy…?", 54 percent of Republican congressional staff answered ideological think tanks (Rich 2004). Only 27 percent of Republican congressional staff rated non-ideological think tanks as more effective. In comparison, Democratic congressional staffers held the opposite views (Rich 2004). Rich's (2004) study of think tanks provides evidence of different individual preferences for information, which suggests this area is ripe for exploration.

One way to better understand the information process, especially prioritization, at the individual level is by looking at the questions committee members ask during

committee hearings. Individuals interested in scientific or technical expertise will ask questions to lead the witness in that direction. Members interested in ideological or partisan information will ask questions to lead the witness that way. By looking at both the individual preferences and questions of members of Congress and the possible ideological leanings of the witnesses, a better understanding of individual information processing in terms of both prioritization and supply can be had.

These three areas, information search strategies, the effects of testimony on policy making, and individual information processing, are all promising for future research on information processing. In addition, there are several additional short term projects that can be addressed using the existing data, including whether campaign contributions can predict which groups and businesses testify; expanding the detailed analysis of energy policy to domestic commerce and health care; which came first: subsidies for alternative and renewable energy or information sources representing the alternative and renewable energy industry; and what determines when information from health practitioners is prioritized or when the information about health finance and insurance is prioritized. In short, there are endless ways to use this new approach to studying information processing, specifically information prioritization, to gain a better understanding of how information from non-elected policy elites affects problem definitions and, ultimately, policy making.

Appendices

APPENDIX A: CONGRESSIONAL COMMITTEES TESTIFYING IN DOMESTIC COMMERCE, ENERGY, AND HEALTH CARE

Table A1: House Committees Testifying in Domestic Commerce, Energy, and Health Care by Type, 1995-2010

House Committees	Committee Type	Number of Hearings
Agriculture Committee	Constituency	48
Appropriations Committee	Power	48
Armed Services Committee	Constituency	37
Banking and Financial Services Committee	Policy	404
Budget Committee	Power	21
Education and the Workforce Committee	Policy	47
Energy and Commerce Committee	Policy	526
Government Reform and Oversight Committee	Policy	374
International Relations Committee	Policy	33
Judiciary Committee	Power*	260
Resources Committee	Constituency	75
Rules Committee	Power	1
Science Committee	Constituency	154
Select Committee on Energy Independence and Global Warming	Policy**	33
Select Committee on Homeland Security	Constituency***	52
Small Business Committee	Constituency	414
Transportation and Infrastructure Committee	Constituency	79
Veteran's Affairs Committee	Constituency	178
Ways and Means Committee	Power	184
Total		**2968**

*Deering and Smith (1997) identify the House Judiciary Committee as a policy committee. Here it is coded as a power committee given how prominent it has become in modern politics.

**Committee did not exist for the Deering and Smith (1997) study. Coded as a policy committee here given it directly looks at two very polarizing issues.

***Committee did not exist for the Deering and Smith (1997) study. Coded as a constituency committee given much of these policies allow members to send funding and equipment to their districts.

Table A2: Senate Committees Testifying in Domestic Commerce, Energy, and Health Care by Type, 1995-2010

Senate Committees	Committee Type	Number of Hearings
Agriculture, Nutrition, and Forestry Committee	Constituency	37
Appropriations Committee	Power*	124
Armed Services Committee	Constituency**	12
Banking, Housing, and Urban Affairs Committee	Policy#	196
Budget Committee	Policy	4
Commerce, Science, and Transportation Committee	Constituency	121
Democratic Policy Council	Policy##	5
Energy and Natural Resources Committee	Constituency	191
Environment and Public Works Committee	Constituency	35
Finance Committee	Constituency**	144
Foreign Relations Committee	Policy	19
Governmental Affairs Committee	Policy	181
Health, Education, Labor, and Pensions Committee	Policy	188
Judiciary Committee	Power###	172
Permanent Select Committee on Indian Affairs	Constituency***	7
Small Business Committee	Constituency**	100
Special Committee on Aging	Constituency***	175
Veteran's Affairs Committee	Constituency***	66
Total		**1777**

*Coded as a constituency committee by Deering and Smith (1997). Here coded as power given the control this committee has over funding now that earmarks are so much less common.

**Committee coded as mixed by the Deering and Smith (1997) study. Coded as a constituency committee here given much of these policies allow members to send funding or other benefits to their districts.

***Committee did not exist or was not coded for the Deering and Smith (1997) study. Coded as a constituency committee given much of these policies allow members to send funding and equipment to their districts.

#Committee coded as mixed by the Deering and Smith (1997). Coded as policy here given that banking and housing have become much more divisive issues.

##Committee was not coded by the Deering and Smith (1997) study. This committee is a venue for policy making for Senate Democrats.

###Deering and Smith (1997) identify the House Judiciary Committee as a policy committee. Here it is coded as a power committee given how prominent it has become in modern politics.

APPENDIX B: DOMESTIC COMMERCE, ENERGY, AND HEALTH CARE POLICY AREAS

Table B1: Domestic Commerce, Energy, and Health Care Policy Areas According to the Policy Agendas Project's Content Coding Scheme

Energy	Banking, Finance, and Domestic Commerce	Health
• General	• General	• General
• Nuclear Energy and Nuclear Regulatory Commission Issues	• U.S. Banking System and Financial Institution Regulation	• Comprehensive Health Care Reform
• Electricity and Hydroelectricity	• Securities and Commodities Regulation	• Insurance Reform, Availiablity, and Cost
• Natural Gas and Oil	• Consumer Finance, Mortgages, and Credit Cards	• Regulation of Drug Industry, Medical Devices, and Clinical Labs
• Coal	• Insurance Regulation	• Facilities Construction, regulation, and payments
• Alternative and Renewable Energy	• Bankruptcy	• Provider and insurer payment and regulation
• Energy Conservation	• Corporate Mergers, Antitrust Regulation, and Corporate Management Issues	• Medical liability, fraud and abuse
• Research and Development	• Small Business Issues and the Small Business Administration	• Health Manpower and Training
• Other	• Copyrights and Patents	• Prevention, communicable diseases and health promotion
	• Domestic Disaster Relief	• Infants and children
	• Tourism	• Mental illness and mental retardation
	• Consumer Safety and Consumer Fraud	• Long-term care, home health, terminally ill, and rehabilitation services
	• Sports and Gambling Regulation	• Prescription drug coverage and costs
	• Other	• Other or multiple benefits and procedures
		• Tobacco Abuse, Treatment, and Education
		• Alcohol/Controlled and Illegal Drug Abuse, Treatment, and Education
		• Research and development
		• Other

The Policy Agendas Project has a content coding scheme that is both consistent over time and across institutions. For more information on the coding scheme, please

visit www.policyagendas.org. The Policy Agendas' data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant numbers SBR 9320922 and 0111611, and are distributed through the Department of Government at the University of Texas at Austin. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here.

APPENDIX C: WITNESSES TESTIFYING AT CONGRESSIONAL COMMITTEE HEARINGS ON DOMESTIC COMMERCE, ENERGY, AND HEALTH CARE, 1995-2010

Table C1: Coding Scheme for Witnesses Testifying at Congressional Committee Hearings

Witness Affiliation	Example	Notes
Public Institutions		
Hospitals	Brackenridge Hospital	Military and university medical centers are coded as 201 and 203, respectively; private hospitals are coded as 101-1.
Schools	The University of Texas, Austin	Universities (public and private) and primary and secondary schools. Organizations representing school districts are coded as government if elected or as interest groups if they are nonprofit
Government		
Federal bureaucracies	Department of Defense	This includes those organizations that are chartered by the U.S. Congress, including research programs, labs, and other programs that are not necessarily federal agencies. Also, includes va hospitals. Those witnesses identified as "former bureaucrat" were coded as bureaucrat and former.
Members (and former members) of Congress	Harry Reid	Current and former Members of the U.S. Congress; former members of Congress only included here when they have no other affiliation.
State and Local Governments	TX Department of Agriculture	State and local governments, elected officials and bureaucrats. This includes organizations that represent state and local governments as well as water, power, and port authorities chartered by states and localities.
Businesses		
Large businesses	Wal-Mart	Having at least 1,000 employees
Small businesses	Molecular Imprints	Having less than 1,000 employees and those where no number of employees was found.
Other		Those business that were unidentifiable, usually had gone out of business in the mid-1990s.
Interest Groups		
Nonprofit and citizen groups	Alzheimer's Foundation of America	Interest groups open membership and think tanks, covers multiple sectors/categories of organizations. Not-for-profits and nonprofits that operate as businesses are coded here (ex. investment orgs for research).
Trade Associations	U.S. Chamber of Commerce	Those organizations that represent entire industries, even if they are not necessarily Trade associations. Also includes chambers of commerce.
Professional Associations	American Medical Association, Just Doctors	Those organizations that represent professional groups even if they are not officially considered professional associations.
Unions	United Steelworkers	Unions
Other		Those organizations with unidentifiable statements of purpose
Other		
Individuals	Victim of car crash	If "representing", put in in a more specific category.
Native Americans		Native American tribes, businesses, or organizations.
Foreign Countries	Foreign Countries	International organizations or foreign governments.
Other	Unidentified or no affiliation	Individuals or those with no affiliation.

The witnesses were coded according to which primary agency, organization, or institution they were representing at a given hearing. Some witnesses are identified by a primary institutional (ex. a business) as well as several additional organizations (ex. trade or professional associations). Witnesses were always coded according to their primary institution, disregarding additional information. The only exception to this rule was for the 'other' category. If a witness was identified primarily as a farmer who was also representing a professional farmers association, he or she would have been coded by that professional association given the uninformative nature of the 'other' category. These exceptions were few and far between.

For more information about how businesses were coded for industry, see the discussion in Chapter Five. For a more detailed discussion on how bureaucrats were coded by appointment and type, see Chapters Four and Six, respectively.

APPENDIX D: PROBLEM UNCERTAINTY CALCULATED BY THE HERFINDAHL-HIRSCHMAN INDEX

Below is an example for how problem uncertainty was calculated using the Herfindahl-Hirschman Index (HHI). A problem uncertainty score (the inverse of the HHI) was created for each committee holding hearings in domestic commerce, energy, and health care policy areas from 1995 to 2010. The four steps for calculating problem uncertainty for a given committee in a given month is shown below. The following steps was repeated for each committee, for each month in this dataset.

To calculate problem uncertainty for Committee 1 in Month 1, all hearings held by Committee 1 in all policy areas was identified using the Policy Agendas Projects' Congressional Hearings Dataset. For each Policy Agendas Topic Number (n=20), the proportion of hearings held by Committee 1 on each area was calculated. See Step 1 below.

Step 1

Policy Agendas Topic Number	**Proportion of Hearings Held by Committee 1 in Month 1**
1	0.25
2	0.1
⋮	⋮
20	0.05

Next, for each Policy Agendas Topic Number, the proportion of hearings held by Committee 1 in Month 1 was squared. See Step 2 below.

Step 2

Policy Agendas Topic Number	Proportion of Hearings Held by Committee 1 in Month 1 Squared
1	0.25^2
2	0.1^2
⋮	⋮
20	0.05^2

Third, the squared proportions of hearings held by Committee 1 in Month 1 are summed to create the HHI for Committee 1, Month 1. See Step 3 below.

Step 3

Policy Agendas Topic Number	Proportion of Hearings Held by Committee 1 in Month 1 Squared
1	0.25^2
2	0.1^2
⋮	⋮
20	0.05^2
	Sum of Squares=HHI

Last, the problem uncertainty measure is found by calculating 1 minus the HHI for Committee 1, Month 1. See Step 4 below.

Step 4

1-HHI= Uncertainty for Committee 1, Month 1

All four steps are repeated for Committee 1 for the rest of the months in this dataset (1995-2010). Then this process is repeated for Committees 2-N. The result is that each committee has a problem uncertainty score for each month during this time frame.

APPENDIX E: FINDINGS FOR CHAPTERS FOUR, FIVE, AND SIX

Table E1: Negative Binomial Models: The Number of Bureaucrats and Careerist Bureaucrats Testifying at Committee Hearings, 1995-2010

Coefficients	Model (1) Bureaucrats	Model (2) Careerists
Uncertainty	0.184**	0.267**
	-0.063	-0.086
Health Policy	0.474***	0.674***
	-0.053	-0.071
Energy Policy	0.270***	0.284***
	-0.058	-0.08
Power Committee	-0.222**	-0.364***
	-0.07	-0.099
Policy Committee	0.275***	-0.025
	-0.05	-0.072
Health*Power Committee	-0.005	0.090
	-0.092	-0.127
Health*Policy Committee	-0.570***	-0.235*
	-0.071	-0.097
Energy*Power Committee	0.335*	0.422
	-0.159	-0.224
Energy*Policy Committee	-0.309***	-0.150
	-0.088	-0.124
Time	-0.053***	-0.038*
	-0.011	-0.015
Appropriations	0.561***	0.342***
	-0.062	-0.088
Lame Duck President	0.132*	0.169*
	-0.061	-0.083
Unified Government	0.165	0.106
	-0.088	-0.12
U.S. House	0.082**	0.185***
	-0.031	-0.043
Republican Majority	-0.165*	-0.049
	-0.079	-0.108
Referral Hearing	-0.233***	-0.386***
	-0.042	-0.06
Total Non-bureaucrats	-0.017***	-0.020***
	-0.004	-0.005
Intercept	0.744***	-0.119
	-0.115	-0.159

NOTE: Significant at *0.10, **0.05, ***0.01 levels. Standard errors are between parentheses

Table E2: Negative Binomial Models: The Number of Businesses and Interest Groups Testifying at Committee Hearings on Energy Policy, 1995-2010

Coefficients	Model (1) Business	Model (2) Interest Groups
Uncertainty	0.190	-0.051
	(0.189)	(0.208)
Power Committee	0.038	-0.204
	(0.172)	(0.188)
Policy Committee	0.051	-0.143
	(0.085)	(0.094)
Total Other Witness Types	0.027**	0.052***
	(0.008)	(0.008)
Time	-0.049	-0.011
	(0.038)	(0.042)
Energy Surplus	0.089	0.043
	(0.101)	(0.111)
Domestic Oil Price	0.002	-0.001
	(0.003)	(0.003)
Other Energy	0.040	-0.554
	(0.273)	(0.334)
R&D	-0.188	-1.159***
	(0.187)	(0.236)
Conservation	0.353*	0.638***
	(0.173)	(0.174)
Alt & Renewable	0.576***	0.381*
	0.144	(0.153)
Coal	0.644**	0.240
	(0.236)	(0.266)
Gas and Oil	0.372**	0.179
	(0.126)	(0.131)
Electricity	0.840***	-0.016
	(0.137)	(0.155)
Nuclear Energy	-0.521**	-0.297
	(0.183)	(0.181)
Appropriations	-1.501***	-1.027***
	(0.274)	(0.244)
Lame Duck President	0.061	0.254
	(0.156)	(0.171)
Unified Government	0.216	0.165
	(0.246)	(0.270)
U.S. House	-0.097	0.286**
	(0.083)	(0.092)
Republican Majority	-0.131	0.126
	(0.213)	(0.235)
Referral Hearing	-0.422***	0.397***
	(0.104)	(0.100)
Intercept	0.687*	-0.127
	(0.329)	(0.361)

NOTE: Significant at *0.10, **0.05, ***0.01 levels. Standard errors are between parentheses

Table E3: Negative Binomial Models: The Number of Bureaucrats and States and Localities Testifying at Committee Hearings on Energy Policy, 1995-2010

Coefficients	Model (1) Bureaucrats	Model (2) States and Localities
Uncertainty	0.451**	-0.162
	-0.17	-0.326
Power Committee	0.229	-0.461
	-0.125	-0.31
Policy Committee	-0.042	-0.029
	-0.072	-0.143
Total Other Witness Types	0.004	0.074***
	-0.006	-0.011
Time	-0.027	-0.034
	-0.031	-0.063
Energy Surplus	0.049	-0.167
	-0.083	-0.167
Domestic Oil Price	-0.003	-0.007
	-0.002	-0.005
Other Energy	0.206	-0.149
	-0.187	-0.549
R&D	0.250*	-1.392**
	-0.124	-0.509
Conservation	-0.507**	0.567
	-0.159	-0.308
Alt & Renewable	-0.292*	0.521
	-0.123	-0.27
Coal	-0.214	0.907*
	-0.222	-0.414
Gas and Oil	-0.222*	0.995***
	-0.097	-0.223
Electricity	-0.055	1.366***
	-0.112	-0.234
Nuclear Energy	0.166	0.128
	-0.117	-0.302
Appropriations	0.305*	-0.804*
	-0.122	-0.386
Lame Duck President	0.052	-0.058
	-0.123	-0.247
Unified Government	0.052	-0.100
	-0.197	-0.397
U.S. House	-0.025	0.069
	-0.07	-0.139
Republican Majority	-0.108	-0.300
	-0.178	-0.352
Referral Hearing	-0.198*	0.514***
	-0.081	-0.146
Intercept	0.954***	-1.113*
	-0.275	-0.565

NOTE: Significant at *0.10, **0.05, ***0.01 levels. Standard errors are between parentheses

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